THE RADIO AMATEURS JOURNAL FOR SPECIALIZED COMMUNICATIONS

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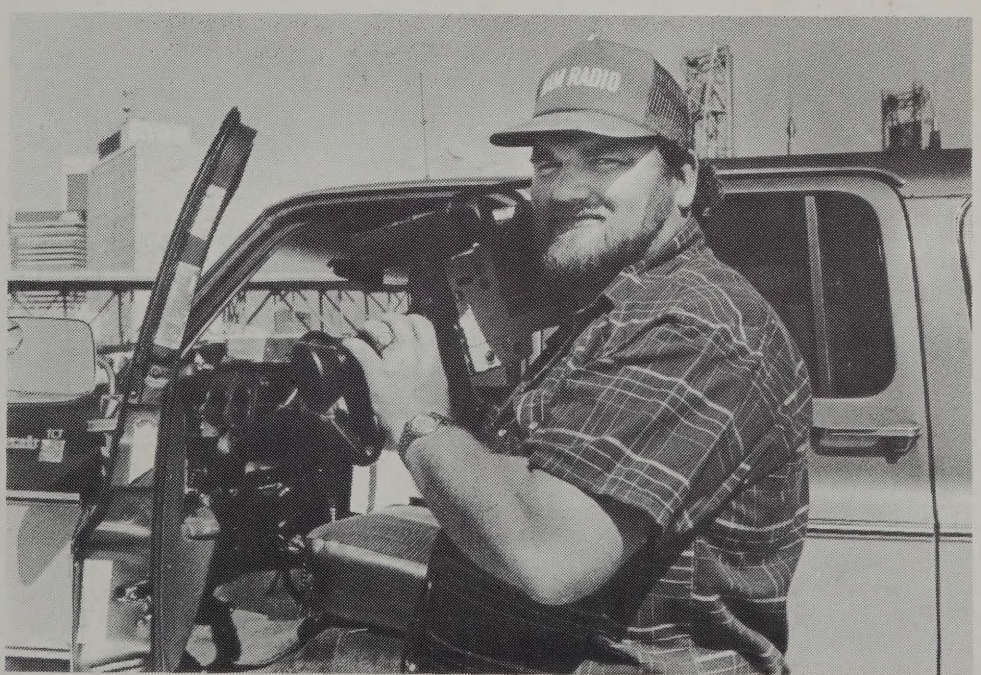

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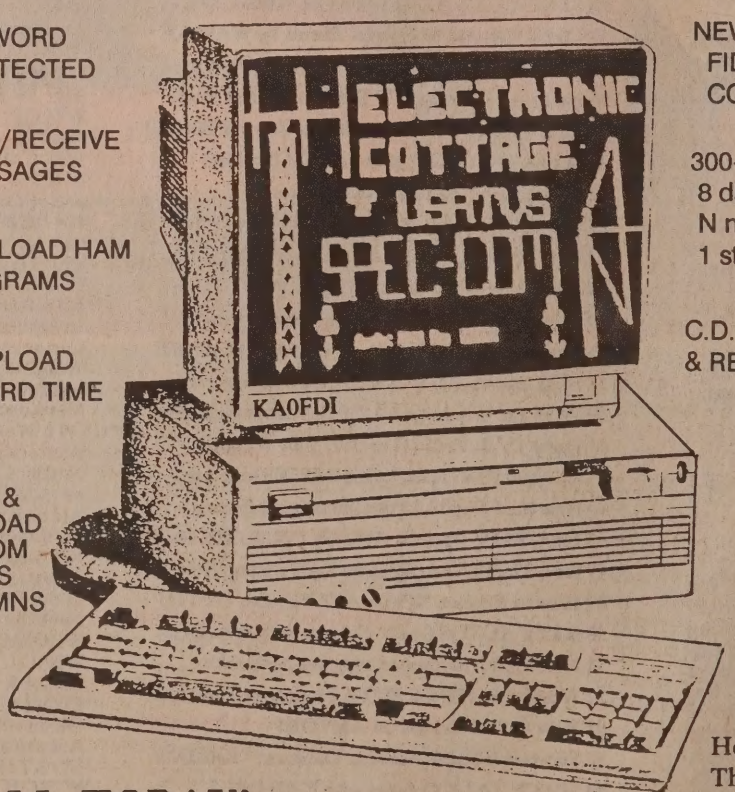

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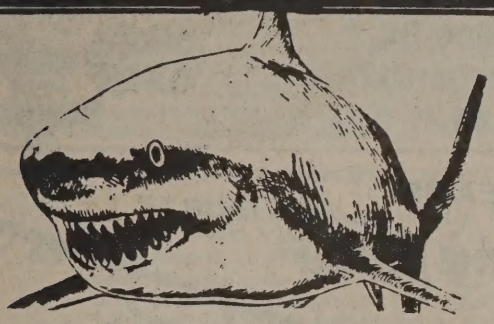
Editorial Comment



FROM JAW's jaw

by KA0JAW - Mike Donovan

It's 1991 (just in case you didn't know) and I can't believe it! Last year was a era of growth. My children grew like weeds and that gave me a fading consciousness that I am getting older (and, I hope, better as the saying goes). The year passed so very briskly that I ended up with a lot of week end, Sunday projects. I just could not find time to accomplish them during the normal work week. This is a new year and I am sure I will have a lot of time to complete them now (Hi Hi).

The growth of our Journal has been sensational the last few months and that gave me an exuberating feeling of youth (so I guess I break even with the above feeling of getting older). The singular motivation of my involvement with SPEC-COM, was and continues to be, the yearning to advance a hobby (how ever practicable, technical, and public serving, it is still a hobby of choice to me) that is important and enjoyable. The fantastic growth and support we are seeing furnishes both WB0QCD and myself with the particular reassuring needed to carry on with even MORE enthusiasm! We do relish your support. What we are doing together is meaningful and does make a difference.

At times, being under the microscope of those you are endeavoring to serve, becomes a bit disconcerting. I really admire how WB0QCD survived under such pressure for so many years. When your motives are pure (yes, I also believe in apple pie, the flag, and motherhood), your intentions are positive, and your optimisms are bounteous it is hard to apprehend those that are inspired by negativism and suspension. Despite the abundant frustration and the extended hours spent behind the scenes wrestling with this unproductive consumption, we have been stirred by the growth and support we have seen from you over the last few months. We will go forward to grow, to improve, and, we hope, to help you in some way. To preserve this hobby I enjoy for my children and to refine your pleasure of the hobby is my goal. As the new year unfolds, I am confident we will reach our goal. Please join us, support us, and be part of our mutually enjoyable hobby. Thanks.

We have seen a lot of improvements to the Journal starting with an exceptional line up of paid, Amateur Licensed, addressed and available to the reader, talented authors & columnists. Through their pens, we are educated, enlightened, entertained, and informed. They are the back bone of the Journal and we sincerely appreciate their unselfish dedication to specialized communication and we thank them for being such an important part of our Journal. We have added LASER print type setting, improved publication software and starting with this issue (or the next if delivery is late to our printer) - an improved grade of paper to provide you with a better looking and an easier to read publication. Our new grade of newsprint is called HI-BRITE in the industry. It is more expensive, has a nicer whiter look to it than regular newsprint, holds its retension longer over the years (yellowing) and yet is lighter than a low grade of actual white paper stock (less cost by weight to mail). We think you'll like the difference it will make.

Because we are largely dedicated to ATV but committed to ALL specialized modes of communication, we have increased the size dramatically of our publication to encompass all this extra information. We have made a real commitment toward improved responsiveness to your needs and toward customer service. We have seen a lot of improvements to the Journal but believe me, we are not finished yet. 1991 will continue unfold dramatic improvements to provide you more for you hard earned money. We will soon be announcing the re-establishment of a TOLL FREE 1-800 ORDER HOTLINE phone number for your optional convenience. This will be a line to be used only for actual orders, subscriptions using a credit card for payment etc. The operator/sub-agent, although a well-known Ham, will be limited in answering any other questions. The ELECTRONIC COTTAGE National Telephone Bulletin Board System is being upgraded even further to provide even more disk capacity, improved modem communications, more information and FIDO NETWORK ACCESS that will allow message exchange relating to our hobby world wide from your local area! I already have FIDO running here in Dubuque and soon we will implement on the EC BBS.

We continue to expand our line up of respected authors with the addition of Greg Mengell KA6DPV in California and the return of Mike Veldman WD0CTA in Oklahoma next issue. KA6DPV joins us with 6-8 pages "every issue" on specific WEFAX technical information. Greg's expertise and experience in this phase of specialized communication is astonishing (former J.E.S.A.U.G. Newsletter editor) and he is a very welcome addition to our writing staff. This new expanded FAX coverage will compliment coverage also be given us by Fred Sharp W8ASF, our longtime SSTV and FAX column editor. WD0CTA was with us a few years ago doing a number of Microwave and TVRO articles. He moved from the Omaha, Nebraska area to Stillwater, Oklahoma, rebuilt his Ham Shack, got married, is now involved with designing and installing commercial Low-Power TV systems and he is ready to return to the writing spotlight. Mike also takes over as our Oklahoma State Section Manager Rep for the USATVS. Dale Lam WA0NKE is now our new Contest/Award Chairman. We apologize on being late with last contest certificates. We haven't forgotten all of you that participated. We are having new certificates printed and they will be mail out from Kansas City shortly. We welcome Dale as not only a thought provoking author but as chairman of this group.

We have a lot of FUN planned for Dayton this year (we hope to share a booth) and hope you plan to attend our Friday and Saturday night scheduled programs. We remain at the RAMADA INN North (as in past years) on Friday night with a special presentation of "Early TV & Radio" for all the 'old timers' and young whipper snappers alike to reminisce & enjoy (see schedule inside). On Saturday night, we will concentrate on FSTV and WEFAX. I understand John Beanland G3BVU of SPECTRUM INTERNATIONAL will be showing off his new English made Weather Satellite System (see ADS). Make plans to join us, as WE bring you the finest, most relaxing and entertaining, evening programs at the biggest hamfest in North America! Things are shaping up for the best ever Dayton Hamfest. Our full speaker lineup schedule will appear in the next issue. Some details on Friday appear in this issue.

According to an announcement by Chairman Alfred Sikes the FCC will initiate a search for frequencies to satisfy the needs of new radio-based technologies. Sikes warned that locating spectrum to accommodate new technologies some such as HDTV, personal phones and digital radio will be squeezed onto the crowded airwaves. The search will be done in 1991. We must stay alert to the ever increasing demand for the airwaves we have.

Zenith Electronics Corp. and AT&T announced on Monday December 16th that they are developing an all-digital HDTV system that solves the problems associated with simulcasting of HDTV and conventional TV signals. General Instrument Corp. announced an all-digital system last month. Other applicants are Japan Broadcasting Corp., Thomson Corp. of France, NBC, and the David Sarnoff Research Center. One other contender, the Massachusetts Institute of Technology may also be pondering a proposal with digital design. The FCC has stated that the selected system must be able to use a simulcast technique to avoid making the millions of televisions now owned obsolete.

With digital design the broadcasts would be sent and received in the form of digital (computer) data. This would provide users with movie-clear pictures and sound equal to that of compact discs. The winner of this race, to developed the standard for future information and television, will be chosen by the FCC in 1993. The first phase of this race will be a test set up by the TV industry in Alexandria, Va.

Spending so many hours in the air (and waiting in airports) is boring for most (me included). I was delighted to find United air lines feeding audio from their communications equipment to the passengers via the optional headphones on longer flights. Just as I was wishing I had a receiver along to pass the time, I discovered the interesting air to ground communications that provides enjoyable listing for us SWL and scanner buffs! Good work United! (this feed has been on channel 9 for the flights I found it on). 73's de KA0JAW

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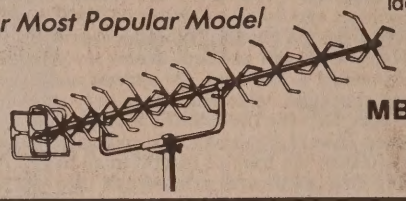

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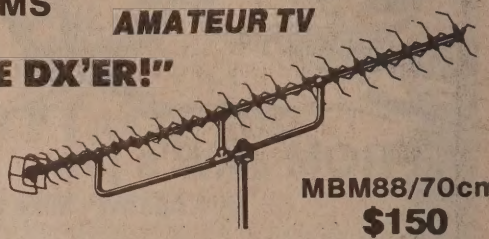

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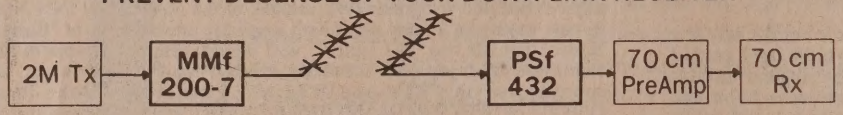

MMf200-7 (usually sufficient)	$55.00	PSf432 (for extra protection)	$99.00
I.L. @ 145 MHz	0.5dB	I.L. @ 435 MHz	0.1 dB
Loss @ 435 MHz	40 dB min	Loss @ 145 MHz	70 dB typ

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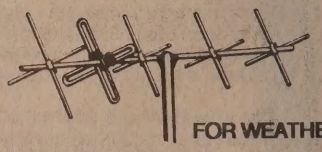

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2 Meter	10M IF	75
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2 Meter	10M IF	315
70 cms	10M IF	ask

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	5XY-137-C	110
2 Meters	10XY-2M	$130
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	70-MBM48	$110
	70-MBM88	$150
90 MHz	DY20-900	$ 95

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23 cms	1268-LY	$ 70
	1296-LY	70
1690 MHz	1691 LY(N)	$92
Extension Kits	1268-LY-XTN	70
	1296-LY-XTN	70
	1691-LY-XTN	75

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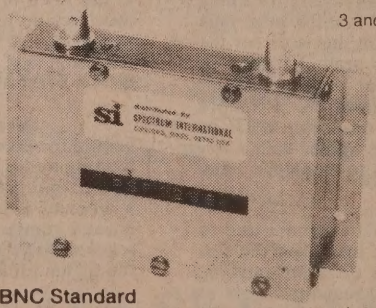
VHF/UHF BANDPASS FILTERS

KNOCK OUT INTERFERING QRM OR SELF—DESENSE!



BNC Standard
TNC or Type 'N' optional
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3 and 5 pole models available

MMF-200-7	Oscar "J"
PSF 137-3	132-142
PSF 144-3	140-150
PSF 220-3	216-228
PSF 432-3	420-450
PSF 421-5	ATV Channel
PSF 426-5	ATV Channel
PSF 434-5	ATV Channel
PSF 439-5	ATV Channel
PSF 900-3	890-940
PSF 923-5	ATV Channel
PSF 1280-3	1230-1320
PSF 1250-5	ATV Channel
PSF 1296-3	1250-1340
PSF 1691-3	1650-1750
PSF 1280-FM	FM TV Channel

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NEWS

MAJOR NEW FSTV RIG ANNOUNCEMENT COMING!

At this print deadline, our hands are tied at providing you exact details (out of respect to the wishes of the manufacturer) except to say that if you think FSTV rig competition is already getting fierce (all to the advantage of course of the video consumer) - you ain't seen nothing yet! Look for a "HOT" new, quality, VESTIGIAL SIDEBAND FILTERED TRANSCEIVER with all kinds of asked for bells and whistles to hit the market very soon - priced V-E-R-Y competitively that is going to absolutely astound the ATV community! That's all we can say for now folks, watch our next issue for complete details!

NASA SPACE SHUTTLE STS-35 LAUNCHES TO SUCCESSFUL MISSION!

As first announced to the Ham Radio community in our NOV/DEC 1989 issue and after 4 previous launch attempts in 1990, NASA finally lifted off safely the Space Shuttle Columbia STS-35 mission (SAREX) on December 3rd with crewman Ron Parise WA4SIR onboard. First reports just in, reveal weak signals heard throughout most of the country except in the lower southern regions where orbits were mostly concentrated. WA4SIR was scheduled to send both Slow-Scan TV images and Packet Radio signals within the 2 meter band, chiefly on 145.550 MHz. Watch for our full-report. The stage is now set for the next SHUTTLE CARRYING AMATEUR RADIO EXPERIMENT - the flight of Ken Cameron KB5AWP and STS-37 with FSTV on-board (restricted uplinking only)!

FCC PASSES NEW CODELESS ENTRY LICENSE! (Docket 90-55)

Late word just in. The FCC in Washington, on Thursday December 13th, Report No. DC-1777, passed approval of the much talked about and debated CODELESS class Amateur Radio license. The version adapted is said to be that of the Quarter Century Wireless Association QCWA and not the ARRL recommended version. Details are sketchy. Basically, the TECHNICIAN license will be modified in February 1991 as the CODELESS entry license to no longer require the NOVICE CODE test. Privleges (for all modes is yet unclear) on 30 MHz and above including 6 & 2 meters. NOVICE remains the same. Current TECHNICIAN license holders will be grandfathered former HF comunication privleges. The USATVS was one of the few early organizations in favor of an no-code license many years ago.

SPECIAL FRIDAY NIGHT SESSION PLANNED FOR DAYTON!

If you are planning on going to the April DAYTON '91 HAMVENTION this year, you won't want to miss the Friday and Saturday Night USATVS ATV WORKSHOP SESSIONS held again at the RAMADA INN NORTH (I-70 & I-75 Little York Road Exit). Friday night has been declared "EARLY RADIO & TV" Rememberance Night with a host of Scanning Disk and Mirror image and early radio restored equipment (that still works!) with full talks and rare actual demonstrations by some of the leading collectors in the country! See details elsewhere in this issue.

73 MAGAZINE TO DO STORY ON OUR MEL DUNBRACK W1BHD

Wayne Green evidently has heard so much good news about Mel Dunbrack W1BHD, our resident "Early Radio & TV" regular columnist, that he sent reporter Bill Brown WB8ELK down to Malden, Mass. to get a story on him! We talked with Mel by phone and he said he gave 73 quite a historic earfull of his accomplishments to WB8ELK in a day long visit to the Boston area. Mel is recovering from a heart attack and throat surgery and hopes to make it to DAYTON this year to participate in our Friday night ATV WORKSHOP activities.

KA6DPV HEADS UP NEW WEFAX COLUMN!

The SPEC-COM Journal has made a commitment to EXPAND all future issues beginning with our March/April '91 issue to include a brand new 8-page (to start) dedicated WEFAX Technical Information Column written by former J.E.S.A.U.G. Newsletter Editor Greg Mengell KA6DPV! A major mailing to over 500 known WEFAX enthusiasts is underway for new sign-ups.

SPEC-COM
The USATVS Journal

NEWS BULLETIN

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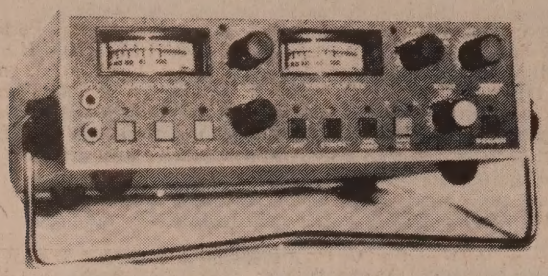
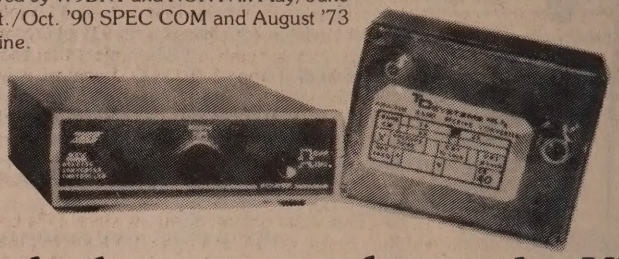


Reviewed by W9DNT and NOIVN in May/June & Sept./Oct. '90 SPEC COM and August '73 Magazine.



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Communications from members . . .

USATVS
The UNITED STATES ATV SOCIETY

From A TV & Radio Ole' Timer...

"I have heard about Mel Dunbrack's EARLY TV & RADIO regular column and want to sign up for a years subscription. Enclosed is $20.00. I built my first TV and transmitter in 1956. I copied the FLYING SPOT SCANNER article published in RADIO ELECTRONICS somewhere between 1952-1955. It used an RCA 630 chassis with 931 photo multiplyer. My home built transmitter was an old S22 with an 832 tripler. I modulated it with a pair of 807's. It was certainly a FUN project that took place over a 2-3 year period. I actually used some of the equipment at a SCIENCE FAIR project in high school. I hope SPEC-COM continues with good construction type articles. Maybe I will even write one myself for you guys? Keep up the good work!" -Robert B. Braun W2EDN, Miami Springs, FL. [Editor's Note: Robert-Check out our special ONCE IN A LIFETIME dedicated DAYTON ATV WORKSHOP session on Friday night at the RAMADA INN NORTH which will be devoted to the EARLY RADIO & TV ERA. -WB0QCD]

ATV Is Alive And Well In Portugal!

"I am an enthusiast for special communications since 1974 concerning the SSTV and ATV. Your magazine looks like it is what I have been after. I am also a member of the BATC in England. Please tell me how I may obtain the "AMATEUR TV HALL OF FAME AWARD" for SSTV and FSTV. I have worked over 40 countries on Slow-Scan TV and quite a few on ATV from here in Portugal one time! 73's" -Manuel Varella CT1GM, Lisboa, Portugal. [Editor's Note: Welcome to the SPEC-COM Journal INTERNATIONAL family Manuel! We distribute to many foreign countries and value our DX membership. Congratulations on the great SSTV and ATV accomplishment! Your certificate will come from Dale Lam, our CONTEST & AWARDS Manager down in Kansas City, KS. -WB0QCD]

Flowers From V.P. At MIRAGE... (Phone comments)

"Great Improvement guys! Full Color Covers, bigger issues, better typesetting, more authors and articles. Now SPEC-COM is at the kind of quality that I would like to see my Company advertisements in. Here's my order for a half-page AD for the rest of the year in your new WHITE PAGE Center Section Insert! Hats off to your AD design department for helping make up our AD" -John Concialdi, Vice President, MIRAGE/klm, Morgan Hill, CA.

FINALLY GIVES IN...

"OK, fine - be that way - I'm tired of driving 115 miles to get my copy of SPEC-COM. I've enjoyed reading SPEC-COM for a year so here's my $20. Keep up the good work! Working on an ATV Repeater in Bakersfield. Any advice, books, etc. would be helpful. 73's" -Terry Godley N6TFQ

AND FROM IRELAND...

"A couple years ago, WB0QCD made comments about SSTVers being mostly appliance operators and that very little was actually being accomplished for developments. I agree wholeheartedly. In a society of technically and industrial progressive individuals, it is surprising that not much new has been developed. Even ROBOT RESEARCH now seems to be shunning Ham developments that made them what they are today. What poor public relations. Is there any hope for a turnaround?" -Mike North EI7CL, Dublin, Ireland. [Editor's Comments: Things have changed considerably Mike. Many interested and still devoted SSTV Hams here and abroad, are bypassing ROBOT RESEARCH altogether, ignoring previous copyright claims and making all kinds of neat modifications and design changes to the basic 1200C system. As has happened in the past, ROBOT will most likely do as they did before - that is, sit back and wait for Hams to develop new ideas and circuits to their units and then at some time in the future - jump back into the market with yet another "updated" model which just happens to have all the latest features. There is something to say for the high costs of R & D these days and quite understandably - it is tempting to let the Hams do it for free. Personally speaking, I'd like to see more promotion of other systems that openly want the Ham business and help. Hams do indeed react to the snubbiness or uncaring acts of any manufacturer. Case in point was the lack of enthusiasm to "get active" in Shuttle SSTV pictures on the recent STS-35 flight. I listened and heard very little about it on 14.230 MHz. Quite a drastic change from sent pictures from W0ORE back in 1985. Alot "IS" happening today on SSTV. Jump back in on 14.230 MHz and check out all the new fancy modes, higher resolution, computer enhancements, etc. -WB0QCD

Mike North EI7CL in Dublin, Ireland working USA SSTV on 14.230 MHz

What a Turnaround Guys!

"Alot of people probably didn't think you could do it - but you did. Working together, you guys really turned the magazine around! The new ELECTRONIC COTTAGE BBS is really neat! I have already checked signed on as a full paid member, have become a regular user and have obtain a lot of useable information from it. It's a great place for everyone to electronically keep in touch with each other!" -Dale Lam WA0NKE, Kansas City, MO.

SEND YOUR COMMENTS TO SPEC-COM AND THE USATVS:

Letters to the Editor
P.O. Box 1002
Dubuque, IA 52004

Some Letters Are Edited for Shorter Content.

"SYNC-BUZZ" ATV Column

Editorial Comments by Mike Stone WB0QCD
R2 Box 86, Clarence, IA 52216

FCC WARC-92 L.E.O. SATELLITE 420-421 MHZ PROPOSAL

As reported in BOLD headlines, within the pages of our NOV/DEC 1990 "SPEC-COM Journal" issue and placed as a BULLETIN on our National ELECTRONIC COTTAGE Telephone BBS (in late October), we notified the USATVS Membership that the FCC has made known a proposal (GEN Docket No. 89-554) for the upcoming WORLD ADMINISTRATIVE RADIO CONFERENCE (WARC) in February-March of 1992 in which 1 MHz of the shared 70 CM Government Fixed-Mobile Services/Radiolocation and Amateur Radio band (420-421 MHz) would be set aside and used PRIMARILY (not secondary) by new LOW EARTH ORBITING SATELLITES (L.E.O.) operated by private business companies. All present users of this area would have to be moved and accommodated elsewhere within the existing 421-430 MHz band.

Other VHF and UHF bands were affected as well but recommended placements were above and below allotted Amateur bands. The FCC is recommending the 930-931 MHz band for UPLINKING and the 420-421 MHz band for DOWNLINKING.

The FCC granted a very short limited period of time (from October 1, 1990 to December 3rd 1990) for comments by the general public. Fred Mia's W5YI REPORT bi-monthly Newsletter (October 15th COL. 12, Issue #20) was the first Amateur Radio publication to pick up on and publish this part of the story in which The USATVS National Organization was first alerted and started to become seriously involved in the matter.

The USATVS, after making several quick individual phone calls to divisional directors and some members of the Frequency Mode Protection Committee, took immediate action and mailed out (October 30th) several NOTICE and OPPOSITION letters to the FCC in Washington, The American Radio Relay League, registered AFFILIATED ATV CLUBS and a number of industry publications. The League (ARRL) responded back quickly with a personal letter from ARRL Executive Vice-President David Sumner K1ZZ. In a letter dated November 7th, 1990, Sumner thanked us for our letter of concern regarding FCC General Docket 89-554 and forwarded The USATVS, a hefty size, 189 paragraph, 146-page reproduction copy of the entire FCC 90-316 proposal package release for our study. The USATVS publically thanks the League for this material and such a rapid retrurn response. Sumner continued with comments in agreement that the **Congressional Executive Branch is on record as NOT agreeing with the FCC for a 420-421 MHz L.E.O placement because of the adverse affect on radiolocation operations.** This is a certain "PLUS" in favor of Radio Amateurs who also would NOT like to see this proposal made at WARC. **Via Sumner's letter, The League has asked The USATVS for any documentation of ATV operations in the lower part of the 420-450 MHz Amateur band** which would certainly be helpful for the League to file additional comments on behalf of Amateur Radio (and specialty operating modes) in general. They also would like to know of any new recent interest and activity growth within the mode in general.

What is significant here, is the unmentioned fact - that for the first time, after many years of political controversy over "unrecognition" of kept National Database USATVS records on ATV Repeater systems, the ARRL in Newington, CT. now openly asks to include this information as "legitimate data" as a significant part of its' packaged fight against GEN Docket 89-554. A copy of the Leagues' letter is on file at our Dubuque Office and copies of the aforementioned correspondence by The USATVS is all available to any requesting member for an SASE and $1.00 in reproduction costs.

The ITU Administrative Council addresses MSS low earth orbiting satellites by providing a WARC-92 Agenda item to "consider possible allocations of up to 5 MHz of a frequency band below 1 GHz to low orbit satellites on the basis of appropriate sharing criteria." (Paragraph 77). Three satellite companies, interested in allocation and conducting business using L.E.O. vehicles, filed comments to the FCC directly regarding this matter. (Paragraphs 78 and 79): ORBCOMM. Starsys, Inc. and Volunteers in Technical Assistance (VITA) **all asked for OTHER THAN 420-421 MHz frequency placements.** Section 2.106 must be amended by the Commission to establish an L.E.O. MSS system to operate. Each company seeks WARC-92 changes that would permit global operations of "PACKET-like" radio signals on channels provided within the agreed upon band.

ORBCOMM has asked for 370 kilohertz of bandwidth in the 137-138 MHz band for space-to-earth transmissions and 478 kilohertz of bandwidth in the 148-149.9 MHz band. Starsys has also made a similar proposal utilizing the same frequencies. VITA is interested in the development of STORE and FORWARD. satellite based packet radio systems for computer-to-computer information transfer (sound familar OSCAR users?).

There is no doubt that it is the FCC itself (Paragraph 80) that is stating that it prefers to recommend the 420-421 MHz band instead of the three companies' proposals for frequencies elsewhere. The FCC cites that the 137-138 and 148-149.9 MHz bands are already overcrowded with many satellite services. 27 non-geostationary satellites and 16 geostationary satellites are identified in the ITU Publication list VIIA of Space Radiocommunications Services and in the Radio Astronomy Service (March 1990). Similarly in the 148-149.9 MHz band, the ITU identifies 30 non and 17 geo-satellites now in service.

We (the USATVS) feel that the FCC does not have sufficient data before the Commission (not entirely the Commission's fault) showing a list of users of the lower 420-421 MHz band segment. Put quite simply, they think it is relatively unused spectrum in the 70 CM UHF band. Afterall, the Leagues ARRL Repeater Directory doesn't show any systems operating down there and as demonstrated in the past, the FCC relies heavily on this publication and database of Frequency Coordinators for specific band use information. **Haven't we HAMS (in particular - Frequency Coordinators, governing Regional bodies and the ARRL) realized what DESTRUCTION and LOSS can result when we DO NOT publish (and hide) known users (LINKS, etc.)? Didn't we learn anything from the loss of 220-222 MHz?**

If the GEN Docket 89-554 were to be accepted and enacted at WARC-92, the loss of even just 1 MHz. of frequency coverage in an already crowded 70 CM "shared" Amateur Radio and Government band would in our opinion be chaotic. Surely, displaced users would immediately look upward invading the longtime lower ATV Channel area which they never respected in the first place. ATVers would have to battle once again with Frequency Coordinators to keep such operations out of the agreed upon ATV operations area. As previously mentioned, there are also questions raised about the possible interference to radiolocation and LINE-A Land Mobile/Base areas as well. We are most concerned about the main 1 plus Mhz burst of radiated energy at 421.250 MHz center video carrier that contains most of the video and sync information (even filtered) which radiates into the occupied 420-421 MHz band area.

The proposal as it currently stands brings up some interesting occurrences. A number of ATV Groups around the country have reported to the USATVS of interference by Amateur FM Repeater "LINKS" improperly placed within the lower segment, 420-421 MHz band by State Frequency Coordinators over the past 10 years. These "hidden" and unpublished frequency assignments by FC's, Regional Councils and The ARRL - will be the new target hardest hit by Docket 89-554 if it is passed. One line of thought, is that displacement of these QRMers would certainly be a blessing in disguise for ATVers who have been suffering interference from these operators with any low-end band TV signal. For the first time ever, these users and the frequencies they operate on, in order to help save that particular portion of the band, might have to be "brought out in the open" to the public and listed in any ARRL report of comments to the FCC for additional strength of present "active users".

In my opinion, the FCC must be presented with a significant list of bonafide users (all modes not just FM or SSB) of this part of the band in order to reconsider its intentions with Docket 89-554. Without this list (from the League), it is highly unlikely that the FCC will change its mind about its intended WARC-92 proposal.

It is unclear just how nearly 60 known, established ATV Repeater and Remote Transmitter systems (perhaps more due to unreported frequency changes as mentioned to us by John Beanland G3BVU who has retuned several repeater vestigial sideband filters over the past

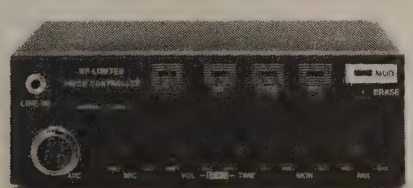
year) now in operation around the country (USATVS Database Report issued July 1990) with their 421.250 MHz wideband television signal would "get along" with new satellite Packet-type DOWNLINK signals that would operate in the 420-421 MHz spectrum area. Perhaps they would get along without any problems. Perhaps the two modes and services could indeed get along with each other. **There should be some sort of technical study and/or actual testing before establishing two modes of possible conflict so close together.** This could be performed using OSCAR Satellites, Packet transmissions and a nearby FSTV station operating temporarily in the satellite portion of the 70 CM band. Isn't it worth a try before recommending this proposal to the rest of the world?

It is felt, by The USATVS (and apparently at The League) that even though there are a number of PRO and CON issues at stake with a lot of unanswered questions, that any loss (even 1 MHz) of any Amateur Radio band is not in the best interest of the Amateur Radio Service. **It is for this reason (and others), that The USATVS has taken a public stand with the ARRL and the FCC "against" the GEN Docket 89-554 proposal at WARC-92.**

On October 30th, 1990, The USATVS filed its' public comments regarding FCC Docket 89-554 with the FCC in Washington. Included with the two page letter was a copy of the entire National ATV Repeater Database (6-Field listing) which listed 178 known systems throughout the USA, 58 of which are known to operate on 421.250 MHz. A copy was also sent to The ARRL to include in their opposition filings with the FCC. No other ATV Group or Company is known at this time (early December) to have filed similar legislation on behalf of ATVers protection prior to the December 3rd 1990 cutoff date.

A number of OBJECTION FORM LETTER MESSAGES (published in the NOV/DEC SPEC-COM issue) were sent by USATVS individual members to the FCC (if you did not send in yours, do it today even though it is past the public comment filing date deadline). The USATVS asks its membership for open comments, pro or con, on this issue. We are on top of it and promise to keep you (the member) well advised of the situation and any further developments.

On the positive side (and there is one big one), if the FCC goes ahead with their presentation of Docket 89-554 at WARC-92, once implemented, all non-ATV users of the 420-421 MHz segment of the 70 cm. band will have to VACATE! It is very important then for The USATVS to act quickly and launch a tireless lobbying campaign effort directly to volunteer Frequency Coordinators and The ARRL **NOT** to allow displaced FM repeater links, etc. movements up into the established 421-440 MHz ATV area and to further push for getting them placed back properly in the 444-450 MHz band as they were suppose to be placed in the first place.



REVIEWS - PAST & PRESENT

Included in this issue is our review of RF LIMITED's new VC-300 Data Recorder unit, one heck of a neat (but of course, expensive) SEIKOSHA VP-1500 Video Printer and A&A ENGINEERING's 450 MHz Spectrum Analyzer. I'd like to point out one thing about our reviews. It has been said by some, that we positively enhance our comments if the unit being tested comes from one of our regular advertisers. Nothing could be further from the truth. In one particular case (AEA), our enthusiastic comments within our pages of several stories and reviews about a new ATV transceiver, were echoed later by independent tests, comparisons and performances by other individuals, ATV Groups and Clubs in other parts of the USA. There have been several models of one device or another that we felt were not up to Amateur Radio standards and we indeed spoke critically about about the unit or apparatus or if really bad, it never made it to the pages of our Journal at all. Some manufacturer's products we outright purchase, are given or trade advertising for. No one person or company has ever implied nor received biased favortism for these exchanges.

CONSTRUCTION PROJECTS

Mike Donovan KA0JAW and I discuss this subject nearly every time we go to assemble each issue. It's one of my pet peeves suffered commonly by all publishers. When I had the magazine by myself for 8 years, I remember scratching, begging and pleading for good construction articles from all of you out there. That particular basket was almost always empty. Unfortunately, times haven't changed much in that area. Everyone wants more building projects but very few contribute any to get printed. When we do present some good ones, hardly anybody writes back if they built them or sends photos of the final completed project. Every local Ham area is the same. There are a couple real good builders it seems in every group - but just try to get them to put their experience and ideas down on paper. You can't. It's a common problem in the whole Amateur Radio hobby industry. No one wants to build anymore. It's just too easy to go out and buy. I admit, I am no exception. In ATV, however, there is still quite a few gadgets not yet commercially available. So why not design and build them? We try to stay away from REPRINTS from other magazines as much as possible except when one comes along that we think you may have missed or deserves a second printing to a different crowd (like our last 12-page BUILD THIS TV TRANSMITTER PROJECT by Rudy Graf and William Sheets out of POPULAR ELECTRONICS). Even with that great article, we have yet to hear from anyone who actually built it. I know some of you did 'cause I checked with the listed supplier of the kits and they did indeed sell quite a few after that issue came out. So where are the photos and stories? If you all want more projects and construction articles, then get off your duffs and submit some, okay? Grrr....

WHY PAY MORE?

I guess the former bashing of non-Amateur designed equipment for HAM-TV use has temporarily ceased? It has at least as long as there is a profit and dealership in it. Interesting. Send an SASE and I'll save you $35 on Universal's V9900 910-918 MHz Wireless TV Transmitter/Receiver. They are only $69.97 in most discount stores.

CONTEST TIME COMING AGAIN!

You ask for it and we delivered as promised. On page 21 (if you can get your eyes unglued from the pretty lady holding the camera) is our announcement of a new annual, spring ATV QSO PARTY FSTV CONTEST! This event is designed for FUN, local CLUB or GROUP and FAMILY participation (not DX). We hope many of you enter. Please make copies of this page and pass it out at your next Club meeting. See Dale Lam's column also for additional comments.

MONITORING TIMES ATV PUBLICITY

Thousands of Shortwave Hobbyists who subscribe to MONITORING TIMES got a glimpse of HAM-TV signals in a two page article that I wrote that appeared back in October. Happy New Year! -WB0QCD

on the ham bands *Mike Stone, WB0QCD*

Monitoring "Amateur TV" Signals

While it's commonly known that you can hear ham operators, few people realize that you can also see them on the television. Along with a variety of other modes, the Federal Communications Commission also allows hams to send TV pictures.

Known as "ATVers" (amateur television), these hams transmit and receive "live" fast scan TV images "over-the-air" just like your local commercial TV station. These can be in black & white or full-color with sound. Unlike your local commercial TV station, however, you'll find some pretty strange programming is transmitted on the ham TV bands late at night and early in the mornings. You are liable to see just about anything. In fact, there are those who say that ham TV could give *America's Funniest Videos* a real run for their money!

What type of TV pictures do ATVers send? They send "live" pictures, home-movies, pet tricks, on-the-air construction or building projects, video from remote planes, boats and trains, weather radar relayed images from the National Weather Service, and more. They use outdoor cameras mounted at high places, run "mobile and portable" and even send signals launched from weather balloons at 100,000 feet!

Several of these balloon flights have already been conducted in Indiana, Ohio, Arizona, Kansas, Tennessee, Illinois and Florida. When one of them goes up for its two hour flight, you can watch the ham TV pictures that they're sending for about 300 to 400 miles! Watch *Monitoring Times* for advance information on future flights.

Ham TV is not restricted to the stratosphere, either. Two upcoming space shuttle flights (STS-35 and STS-37) are expected to send ham TV signals back from space! Dr. Ronald A. Parise's long-delayed mission is expected to carry, among other things, slow-scan TV pictures (still-framed images in color) and it is believed that Lt. Col. Kenneth D. Cameron, scheduled to fly aboard STS-37 later this year or early next, will be equipped to receive (and, many of us believe, transmit) ham TV pictures from specially authorized ground stations.

Some ham FM radio repeaters on VHF relay NASA Select Space shuttle audio. To see if there is a ham radio FM repeater near you that is retransmitting this information, program your scanner to "scan" from 144.0-148.0 MHz. Tune in and join the fun!

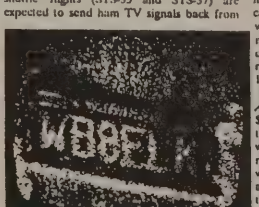
Even ordinary ham TV signals can travel over great distances on UHF when the band is just right (DX). My 439.250 MHz TV signal here in Iowa has traveled across Illinois, Indiana to Ohio -- over 470 miles -- more than once! Most hams transmit 100 watts of power on high-gain beam antennas so the signals are quite viewable with modest receive equipment. It is really neat to be able to "see" someone waving back at you from several states away!

What interest is this for you non-hams? Good news! You, with your shortwave monitoring station, can receive these signals if ham TV activity exists in your area! How can you tell when ham TV is on-the-air? You won't find it listed in *TV Guide* or your local newspaper TV show listings. You'll have to do what you do best - monitor. Set your receiver to tune just below UHF TV Channel 14 in the 420-440 MHz band.

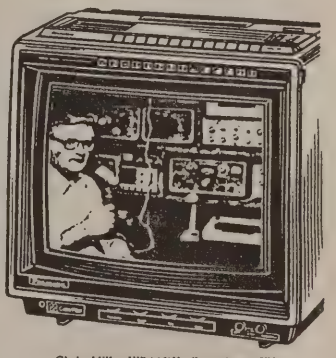
You may also want to purchase the *North American National ATV Directory* ($5.95 plus $1 postage, from Spec-Com Communications, P.O. Box 1002, Dubuque, IA 52004), which lists over a thousand operators with maps of active locations. With this list you will be able to tell what system is in your area and even what UHF-TV frequency they transmit on.

If you have a cable-ready TV set or VCR, you might be able to tune in the hams on Channels 57-60 without buying additional equipment. You will need to disconnect your cable feedline, however, and hook up an outside UHF TV antenna. Some TV's and VCR's tune far enough below Channel 14 to get HAM-TV signals directly.

Of course, there are special antennas and preamps that "boost" signals available for ham TV reception. Contact John Beanland at Spectrum International, Inc., P.O. Box 1084A, Concord, MA 01742. Their catalog is



1988 478 mile record DX signal, from Bill Brown WB8ELK in Findlay, OH, to Mike Stone WB0QCD at Lowden, IA

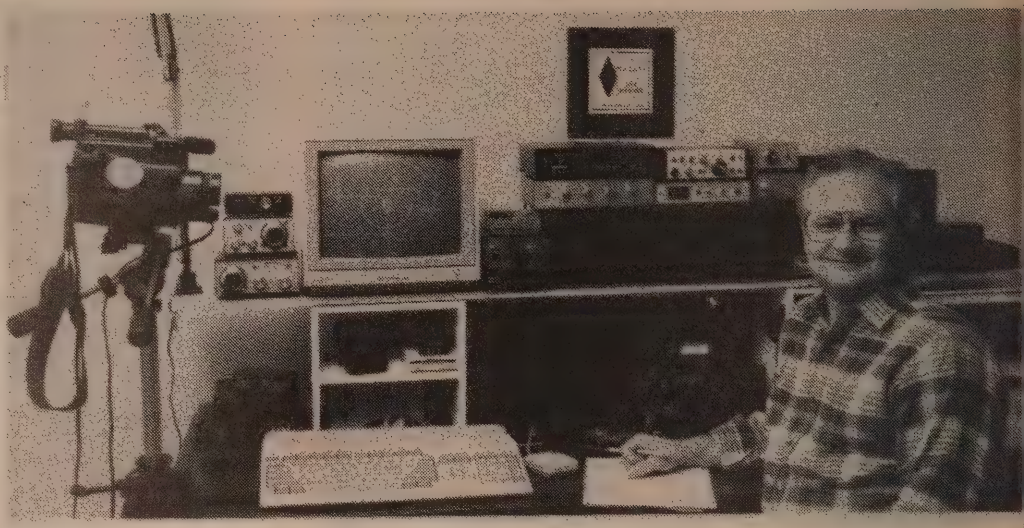


Clyde Miller WB4AOH, Owensboro, KY

"CLUBS, CONTESTS and SPECIAL EVENTS!"

Report filed by:

Dale Lam WA0NKE
5045 North Kensington,
Kansas City, MO. 64119



Pictured right: ARRL Life Member WA0NKE and his modern ATV station setup including Weather Radar.

Welcome to the second in the series of Club News and Special Events. I want your contributions of information about your clubs activities. Send me your club newsletter and I'll include its information in this column, so your club gets it proper notoriety. If you have had a special event, send me an account to share it with the readers. Send your information to:

Dale Lam - WA0NKE
5045 N. Kensington Av.
Kansas City, Mo. 64119

I want to thank Wayne Chandler - N4KWC for writing the story of ATV in Jacksonville, Florida. His sent photo is on this issues front cover and here in my column. I have included his article in full. We also have a major section concerning the problems experienced by the Quad City ATV Club of Davenport, Iowa.

INDIANAPOLIS, INDIANA

The Indiana Amateur Television and UHF Club Newsletter reports their activity level was high for the ATV Simplex Contest. One FSTV station reported working 30 ATV station in 30 minutes. "The stations were located from Iowa to West Virginia. Most were running under 15 watts." Unfortunately this was the week BEFORE the contest. One of their recent meetings had a program about HDTV. The speaker was Lauren Christopher, Manager of Advanced Television Development for Thompson Consumer Electronics. She spoke about the different competing systems being developed for the US market. With their Homebrew Contest and great programs, this sounds like a very active and fun club to belong to.

Davenport ATV Repeater and the FCC

This is the story of the Davenport, Iowa ATV repeater club, now called the QUAD-CITY ATV CLUB previously known as BRATS, and its run-in with the FCC. Though I don't know the exact background of the problems within the club it is fair to say, that some of the club members became disgruntled. Part of the problem dealt with the way in which the ATV repater was being used. Both the personality problems and the proper use of the ATV repeater grew to be a large enough agrivation that the disgruntled members decided to get the FCC involved. The request of FCC involvment is usually seen as the "last resort"' by the amateur comunity, to make someone stop breaking the FCC rules and regulations.

The Washington D.C. office of the FCC got a telephone call from one of the disgruntled hams, in which the various allegations were listed. Apparently the FCC person taking the call determined that the problem could be bad enough to warrant a possible field investigation. The caller was told to write the complaints in a letter, explain each problem, and to send it to the Kansas City office of the FCC. It was sent with 14 amateur call signs listed as cosigners to the allegations. Curiously none of the "14 concerned amateurs" actually signed the letter.

One of the QC ATV Club members called the SPEC-COM Journal main office in Dubuque to see if Mike Donovan KA0JAW knew anything about the rumored allegations. He didn't and it is at this point in the story that I became aware of the problem. I was asked by SPEC-COM, in the capacity of newly appointed USATVS Kansas State Section Manager and as the magazines Ham Club columinst field reporter, to go to the FCC office in Kansas City (its only about 10 miles from my house) and meet with the Public Affairs Officer. The SPEC-COM Journal was concerned primarily about the possible re-procussions about the use of 144.340 MHz as a controlling frequency for remote transmitters used by several groups around the country (it had been denied a few years ago "when asked" by a petitioning Chicago area resident ATVer).

Ms. Sharon Scott of the FCC, is not a ham herself, but has worked closely with amateurs during her years of service in the K.C. office. I met with her on two different occasions. The first was to discuss the complaints in the letter and get her initial response to the accusations. The second was to find out about the outcome after the accused had sent in their written responses.

Complaints Sent to FCC

The following is not the word-for-word list of the complaints, but is the basic idea of each of the complaints. My comments as to Ms. Scott's concern about each one is in parentheses ( ) following the complaint.

1) The WB0BIZ ATV repeater was being controlled via a two meter frequency (144.34 Mhz) rather than the required control frequency of 220 Mhz band or above. (If proven this would be a violation.)

2) The repeater, either from sources at KWQC-TV the home of the repeater or from amateur stations using the repeater, was transmitting commercial and copyrighted material, such as: ESPN, Cubs Baseball, etc. (If proven this would be a violation.)

3) Stations didn't identify their transmissions when transmitting touchtone commands or when transmitting video for well over an r an at a time. (If proven this would be a violation.)

4) The ATV repeater transmitted internal KWQC-TV station computer and status signals. (This is not a violation of any FCC rule.)

5) Music was transmitted on the ATV repeater. (This could be a violation under some circumstances.)

6) KAVORUS Color Weather Radar was transmitted on a 24 hour basis. A beacon mode was being used on a non-beacon frequency and it is a commercial leased video source. (Beacon mode is not seen as a violation of the use of the repeater. If permission is granted for the use of the radar video and it is being used as a public service, there is no violation.)

7) The repeater was used for the continuous transmission of color bars, video ID, or other constant video source for long periods of time. (Not a violation if proper station identification is done every ten minutes.)

8) Amateur transmitters were used by the local commercial TV station (KWQC-TV) as video and information sources for the coverage of the BIX Race (a local Davenport area long distance run). (This is not a violation by the commercial station but could be for the amateurs.)

Other Notes:

No dates and times of any violation was provided, nor was any audio or video tape provided which might be used to substantiate the

claims.

It has been reported, that many of the listed, on-screen, alleged violations were quickly "cleaned up" after word of the letter being sent to the FCC leaked out.

It was interesting to see how she approached this kind of problem. First, Ms. Scott read the complaint letter and attempted to make preliminary judgements as to which of the allegations were likely to be violations. Some of the allegations were of no interest to the FCC as they were not covered by FCC regulations. She ultimately decided to send a copy of the original complaint letter to each responsible party, so they could respond in writing to the allegations.

The complaint letter had a list of 14 amateurs call letters and the claim that these people agreed with the contents of the letter, however there were no signatures from these 14 people. The lack of signatures and the lack of specificity of date and time made the credibility of the letter's allegations weak. This was especially evident after the response letters, each of which was signed, were received from the repeater trustee and the TV station.

The TV station had a very short response that said it had done nothing wrong even if the things in the letter were correct. In other words they recognized no violations.

The ATV repeater trustee's response was quite complete and covered each point made in the complaint letter. Basically it stated the exact contrary to each allegation. Also, included with the trustee's letter was a block diagram of the complete repeater system. It showed both a 440 Mhz band control link and a telephone line control link to the ATV repeater. In addition letters were sent from many current club members, stating that the allegations were untrue. Each of these letters was signed by the writer.

The "Bottom Line" is that the original complaint document lacked proper evidence, to back up the allegations, and lacks credible witnesses (a list of calls with no signatures). In fairness to the complainers, the FCC did however, receive a separate, signed letter (different person and mailing location from the original filed complaint) who was indeed listed among all the other callsigns, who did testify to give validity to "some" of the statements made along with his own his own interpretations of the matter.

The requirement for a written response was deemed, by Ms. Scott, to be sufficient action by the FCC at this time. While not being put on formal notice this does remind all that they must observe the required proper operation procedures.

Ms. Scott's Philosophy Towards Ham Problems

Many times Ms. Scott declared to me, "Children must learn to play together!", when I asked about her philosophy of dealing with the amateur community. By this she meant that disagreements between amateurs should be dealt with among themselves, using the ARRL, or other ham organizations as mediators. Additionally, she stressed, if the FCC had to get involved in ruling on a disagreement between hams, that most likely the outcome would only satisfy her and the FCC. I took this to mean that hams would lose and not gain by FCC involvent. **She also stated that the next time an FCC person was in the Davenport area, they would take time to monitor the ATV repeater and to look for violations.** (Davenport, this is your notice to be on your best behavior. Uncle Sam is looking.)

The problem between club members and their inability to come to a common agreement lead to much consternation by all persons involved. This should be a lesson to all of us. Don't let problems get too big to handle amongst ourselves. When we operate our stations we must observe the required operating procedures, because they are required. My final observation of this case is that the hams have a friend in the Kansas City office of the FCC in the person of Ms. Sharon Scott. I was impressed with her ability to deal with this problem, in a way that will insure proper radio procedures will be followed without adversely impacting other hams.

NASA USES K4GCC AUDIO FOR VIEW SITE!

That was the leading headline in the November 1990 Newsletter of LISATS - Launch Information Service & Amateur Television System, Inc. from Cocoa Beach, FL. Because of a fueled TITAN 4 that was on Pad 41, NASA has to move the traditional NASA Causeway viewing site further west for range safety reasons. Pad 41 was not prewired with their Launch Commentary line. NASA people remembered the Ham Radio K4GCC 146.34/94 FM Repeater and they called up John K4GCC to ask "HIS" permission!!! The Club even got a letter from England from parents of a daughter who videotaped the launch (and audio) asking what the Ham Radio CW callsign was all about. Lots of other news from LISATS in my next column. Interesting note: At the top of the Club Newsletter mixed in with the Volume and date line is the sentence; "An Affiliate of the United States ATV Society". What did I say in my opening paragraph? Way to go Cocoa Beach!

YES! ANOTHER FSTV CONTEST!

Check out the babe on page 21! If you can get your eyeballs peeled off long enough - read all about a new (hopefully) annual NATIONAL ATV QSO PARTY CONTEST to be held during the weekend of March 15th 1991. Plan to work it, okay?

Amateur Radio Emergency Services

Present Day ATV in Jacksonville

By Wayne Chandler N4KWC
9425 Sappington Avenue,
Jacksonville, FL. 32208

[Editors Note: This article was submitted to us electronically on November 27th, 1990, our first general ATV article UPLOADED by a member into our new E.C. BBS! N4KWC has been designated as the USATVS National ARES ATV Coordinator. He is also ARRL ARES Emergency Coordinator for Duval County in Florida serving N.E. Florida American Red Cross, Jacksonville Fire/Rescue Division, Florida Dept. of Forestry, Civil Defense, NOAA Weather Service and the Jacksonville Hospital Disaster Council.]

Fast Scan ATV in Jacksonville started back up in 1987 when Barry Baines WD4ASW and Mike Baker WA4HFR from Gainesville came to a local club meeting and spoke of ATV . Soon after that meeting Mike Maldin WD4AOG, Rick Oreair WB4BSP, and myself purchased ATV equipment and got on the air. It took many hours of trial and error and experimentation to get our stations working simplex five to twenty miles. Herb Minton, N4MJN was soon on ATV also. Mike WD4AOG transmitted Space Shuttle video whenever the shuttle was flying. He had already been transmitting the audio on his 147.12 voice repeater for a year or so.

In 1988 we had coverage of the Jacksonville River Run in Downtown Jacksonville with three cameras in operation. It was well received by the public. We were also involved with some experimentation by the Florida Department of Forestry. Herb, N4MJN and myself made two fly arounds of the Northeast Florida area in the Departments fixed wing airplane. Video was received by ATVers all over the area.

In November of 1988 the Department of Forestry had a drill in Nassau County where Gary Coe N4UMD and myself went up in a Huey helicopter transmitting ATV back to the Command Post. Herb N4MJN was in charge of the receiving station. In the summer of 1989 we had ATV coverage of the salvage efforts of the Civil War ship "Maple Leaf" led by Dr. Keith Holland WB4KKD. This was a Union Ship that was sunk on April 1, 1864 by Confederate mines in the St. Johns river. Keith has led efforts to excavate the artifacts from the ship. The first sword recovered was shown "live" on ATV.

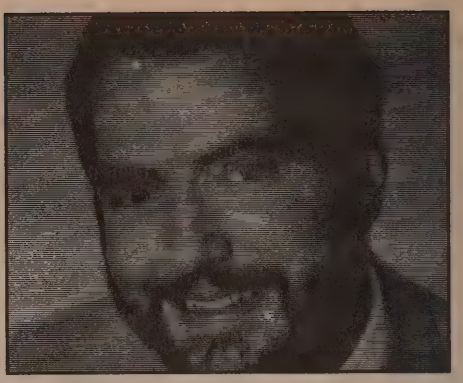
In early 1990, we formed a group and put together a repeater. We had previously been transmitting a beacon with shuttle video and ID shots of Jacksonville. We have had good public reception of our efforts and even had an article about ATV written by the Florida Times Union, which included a good story as well as pictures (see photo in this issue). Our ATV System has a 436.00 Input with 421.250 and 1253.25 output at one location and a user selectable 426.250 output which carries NASA select. We are vertically polarized and use 144.340 as our comm channel.

We enjoy band openings into Daytona Beach with Vic W3LGV and his group, and into Orlando, Merrit Island, Cocoa Beach, Ocala, and Gainesville for eyeball QSO's with hams in the state. We have just written bylaws for our group. We meet on the second Tuesday of the Month (bi monthly-odd months). Some of the ATVers in Jacksonville are Mike Parnin N4EPD, Randy Johnson WD4SFR, Barry Baines WD4ASW, Barry Edwards KC4MSX, Henry Cordes AA4QI, Roger Peck N4UBM, Mike Maldin WD4AOG, Herb Minton N4MJN, Russel Treadwell AA4MO, Mitch Kelly WB4RUT, H.L. King N4RPA, Rick Oreair WB4BSP, John Alexander WA4CDZ, Charlie Wilworth KC4OFI, Paul Locke KB4PML, Frank Grady W4RRD, Gary Bangles KB4ZXY and Tex Kern W4MET. It's great to see a "CLUB" column within the expanded pages of "SPEC-COM". 73's from N4KWC!

Fast Forward Video

Video and TV Questions/Answers

with RON HRANAC NØIVN
WESTERN VISION ATV NETWORK
466 Pluto Court, Littleton, CO. 80124



Ron Hranac

"I just returned back from visiting JAPAN on business and will return there again in January. I am hoping to make contact with SPEC-COM's Japanese Foreign Representative, JARL CQ-JA Column Editor, Fast and Slow Scanner Kitsu Kambara JG1DDT. Full report on what's happening over there Ham wise in an upcoming issue!"

First, a couple letters from the mailbag; Bernhard Keiser WD4O writes:

"I read your 'Proposal for an ATV Frequency Coordination Standard' (Sept/Oct 1990 SPEC-COM, page 25--Ed.) *and agree 100%. I am a consulting engineer in radio systems and also teach continuing engineering education courses covering television transmission, in addition to being active with our local Metrovision FSTV club here in the Washington, DC area. I would like to see the ARRL and every frequency coordinator in the country get a copy of this chart and the accompanying explanation."*

Dr. Alan Chandler, VP Engineering at AEA has additional comments on power measurements using the BIRD 43 wattmeter (Sept/Oct 1990 *SPEC-COM*, page 20):

"I noticed a response by you in SPEC-COM regarding the Bird 43 wattmeter readings. I looked in detail at how the 43 works and what it really displays. It is not really a 'wattmeter' but an average reading voltmeter with a scale that is calibrated in watts. The Thruline elements vectorially add a sample of the transmission line voltage and a voltage developed across a terminating resistor due to the transmission line current. The result applied to the detector is a voltage sum rather than the product of the transmission line voltage and current, so it is not a true power meter but a voltmeter with a power scale. That is the reason that the meter reads the same with say 1 watt CW and 1 watt with 100 percent AM modulation. With 100 percent modulation, the peak power is 4 watts, and the average power is 1.5 watts but the meter reads 1 watt because the average voltage is the same.

Bird has a chart in their catalog showing various signal types including a 'black' television signal and indicates that it should read 59.6% of the peak sync level. Unfortunately, the black is peak black (0 IRE) rather than the reference level black (7.5 IRE) which has confused things even more. I calculated what the Bird 43 should read (that is, I did the numerical integrations required) with reference level black and with a reference white signal (100 IRE) and they are 53.4% and 25.5% of the sync peak respectively. Although they are not substantially different than what one would get from average power, they are different and in the direction that could cause some problems, such as sync compression and even worse, calls to our customer service lines, hi."

Dr. Chandler's comments about the operation of the BIRD 43 are correct; my description of average power measurements (RMS current x RMS voltage) actually referred to the use of a true power meter such as Hewlett-Packard's HP 435B. But whether using the BIRD or an HP meter (neither of which have the capability for true peak measurements of modulated TV signals), a modulated video carrier will result in less indicated power than is actually present, even though the PEP has not changed. Bottom line: the wattmeter reading is relatively meaningless in the presence of video modulation.

Q - What is vestigial sideband transmission and what is the difference between VSB and DSB?

A - The baseband video signal from a TV camera or VCR is about 4.2 MHz wide, and when it amplitude modulates an RF carrier results in a transmitted signal that is nearly nine MHz wide. When you include a 4.5 MHz audio carrier with the video, this double sideband (DSB) TV signal can be 10 MHz or more in width (Photo 1).Commercial broadcasters have for years been limited to a six MHz transmitted bandwidth, and to accommodate that bandwidth restriction use vestigial sideband (VSB) transmission.

In TV broadcasting VSB means that the carrier and full upper sideband plus a small portion--or vestige--of the lower sideband are transmitted. Why not just the carrier and upper sideband? Unfortunately, the nature of video is such that quadrature distortion results if energy from both sidebands is not present. Broadcasters found that quadrature distortion could be reduced substantially if a small part of the lower sideband (0.75 to 1.25 MHz) was transmitted along with the carrier and full upper sideband. Photo 2 shows a true VSB TV signal from an exciter that uses SAW filtering to eliminate most of the lower sideband. Here the transmitted signal is kept within six MHz.

The DSB signal in Photo 1 is the one watt output from an ATV transmitter (the signal has been attenuated to keep from overloading the spectrum analyzer). Notice that the DSB spectrum with the audio carriers occupies just over 10 MHz (the spurs 4.5 MHz above and below the audio carriers are third order distortion products generated in the transmitter's final RF stages). VSB-type filters available from companies such as Spectrum International will reduce the bandwidth of DSB ATV signals, and should be installed after the last amplification stage (eg., external power amplifier, or the rig itself if operating barefoot).

The following questions are among those commonly asked at ATV presentations I've participated in at hamfest workshops and ham club meetings. They've been put together--with the answers--on a handout that Denver's WVN now passes out at such meetings. The following is adapted from "ATV: A Beginner's Guide to Amateur Television."

Q - What is ATV?

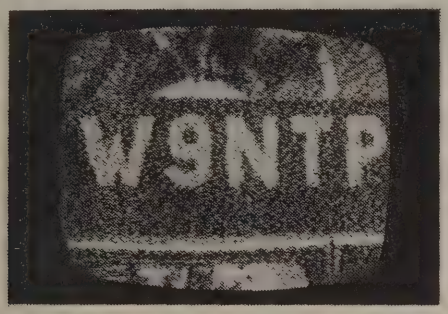
A - ATV, or amateur television--also known as FSTV (fast scan television)--is a form of image communications where real time TV pictures with color and sound are transmitted and received using amateur frequencies in the 70 cm and higher bands. FCC rules require that an amateur hold at least a Technician class license to use most of these bands, although Novices may operate ATV in the 1270-1295 MHz portion of 23 cm.

You may already be familiar with SSTV (slow scan television) in the ham bands. FSTV differs from SSTV in that the latter involves the transmission of still images, sort of like a slide show. Slow scan takes from 8 to 72 seconds or more to send a single picture, while fast scan is just like what you see while watching your favorite network TV station--without the commercials, of course. Imagine watching the person you are talking to, or seeing a demonstration of the operation of your friend's newest rig!

Q - How does it work?

A - Video from a camera, VCR, camcorder, computer or video game along with your microphone's audio are connected to an ATV transmitter that converts these signals to RF. The transmitted video and audio together occupy a bandwidth of six to 10 MHz, depending on whether vestigial sideband or full double sideband transmission is used. The wide bandwidth is one of the reasons that ATV must operate on the higher frequencies, where the necessary spectrum is available.

Normally an ATV signal's video carrier is amplitude modulated, and the sound is transmitted on a separate carrier 4.5 MHz above the video carrier, using frequency modulation. This technique results in compatibility with regular TV sets, so all that is needed to receive ATV is a simple downconverter. In fact, some



hams use cable-ready TVs or VCRs to tune in 70 cm ATV transmissions, and others use cable TV set top converter boxes.

Three six-MHz wide ATV "channels" are available in the 70 cm amateur band. The first is 420-426 MHz, with the video carrier at 421.25 MHz and the audio carrier at 425.75 MHz. The second is 426-432 MHz, with its video carrier at 427.25 MHz and audio at 431.75 MHz. (In some areas, this second channel is operated one MHz lower to avoid interfering with EME and weak signal communications around 432 MHz. In this case, the video carrier is 426.25 MHz and the audio carrier is 430.75 MHz.) The third channel is 438-444 MHz, with the video carrier at 439.25 MHz and the audio carrier at 443.75 MHz. A fourth 70 cm channel is sometimes used; it covers 432.75 to 438.75 MHz, and has a video carrier at 434 MHz and audio carrier at 438.5 MHz. Because of OSCAR satellite activity in the same frequency range, this fourth channel is not as popular as the other three.

Other ATV channels are available in the 33 and 23 cm bands. In any of these bands, including 70 cm, simplex communications may be used in addition to repeater operation. Repeaters can be in-band or cross-band, depending on local frequency usage. Some ATVers transmit on-carrier audio instead of using the separate 4.5 MHz audio carrier. This involves frequency modulating the video carrier with the transmitted audio, while the transmitted video simultaneously amplitude modulates the same carrier. On the 33 cm and higher bands, FM video is occasionally used.

In a typical ATV station, the video and audio to be transmitted are connected directly to the transceiver. A TV set is hooked up to the transceiver's monitor output (or a separate downconverter output when operating cross-band), and received signals are viewed on the TV.

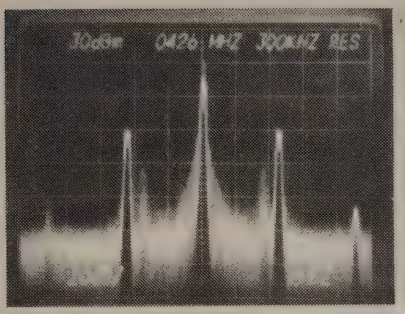


Photo 1
Double sideband (DSB) TV signal.

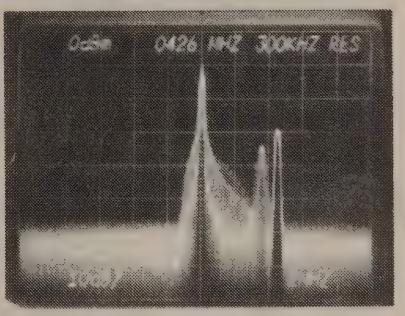


Photo 2
Vestigial sideband (VSB) TV signal.

Antennas for ATV are a bit different than those used for voice communications. Whether home-brew or commercially built, consideration must be given to very wide bandwidth operation. Several manufacturers have ATV-specific antennas available: KLM, AEA, Rutland Arrays, Tonna, Spectrum International, Lindsay, Cushcraft and Downeast Microwave are well known among the ATV ranks. ATV transceivers are available from T.D. Systems, P.C. Electronics, AEA, and Wyman Research.

Because of the higher frequencies used for ATV, good quality low loss coax such as Belden 9913 or even Andrew hardline is mandatory. RG-8, RG-213, RG-214 and similar cables generally have too much loss except for very short runs. Carefully assembled connectors--usually type N--and a *line-of-sight* location for your antenna system are a must! Remember, you are dealing with a very wide bandwidth signal at UHF and higher frequencies. (Note: one manufacturer, T.D. Systems, has a line of ATV gear that places transmitter and receiver modules at the antenna, and a control unit in the shack. This does away with the need for expensive low loss coax in many cases.)

Q - Why is ATV becoming more popular?

A - "A picture is worth a thousand words" fits ATV to a tee. Fast scan ATV is gaining popularity because of the new smaller, lightweight, low cost equipment now available for this mode. VCRs and camcorders are commonplace in the homes of many hams, and nearly everyone has a TV set.

There is even talk about an ATV repeater in one of the new AMSAT satellites. Hams who now use ATV to provide coverage of public service events, severe weather, emergencies, and demonstrations at hamfests are providing super incentive for new ATVers. Some hams are transmitting sophisticated computer graphics via ATV, and others have launched camera-equipped high altitude balloons that send pictures "from the edge of space" on ATV frequencies.

Q - What does it take to get on the air?

A - The cost of a basic 70 cm in-band transceiver is $300 to $350, and cross-band operation will also require a downconverter to receive the second band for an additional $100 to $150. A TV set, video camera, and appropriate antennas and coax complete the station.

Denver's Western Vision Network launches ATV-equipped balloon

By Ron Hranac NØIVN

In all the years I've been a ham, I've never seen anything in the hobby generate as much enthusiasm as WVN's Sunday November 18 balloon launch. A couple months before the actual event, Jack Crabtree AAØP suggested that the group might be able to put together such a launch if Murphy didn't get in the way. Well, WVN supported his idea, and the infamous "Railroad Committee" appointed Jack project leader.

What resulted was a balloon launch that had as its payload a 426.25 MHz ATV transmitter (1.5 watts), a 147.555 MHz FM beacon (600 milliwatts), and a 28.8 MHz CW beacon (160 milliwatts). Coordinating a balloon launch requires a lot of work, so many of the tasks were assigned to a number of individuals who served as team leaders.

Merle McCaslin KØYUK was in charge of the balloon, and was responsible for pre-launch activities including acquiring the balloon, parachute, and the helium and balloon filling system. Dave Clingerman W6OAL took charge of the payload itself, and designed and assembled the payload. Dave integrated the its subsystems (power, telemetry, antennas, beacons, ATV transmitter, video ID and camera, and the payload housing) as separate but interconnected packages.

Steve Hoffman NV9O was in charge of operations, and took care of the launch site selection and preparation, launch operations and was the liaison with the FAA. Tim Armagost WBØTUB (whose callsign was on the video ID and the 2 meter beacon) took care of public affairs, and was responsible for coordinating the VHF and HF net operations, fund raising, and publicity. Tracking and recovery was headed up by Rick Von Glahn NØKKZ. Rick worked with local foxhunters on post-launch balloon tracking, position plotting and payload recovery. In addition to fixed and mobile tracking, three airplanes assisted in payload recovery. Bill Brown WB8ELK provided a lot of useful assistance and advice, and loaned WVN the small B&W camera for the payload as well as the 10 meter beacon transmitter (Bill's callsign was on the 10 meter signal).

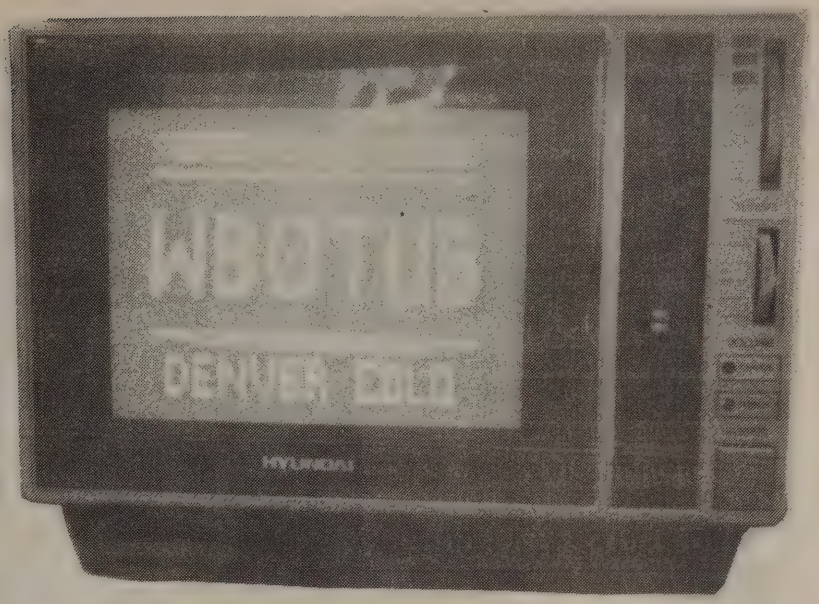
Computer predictions the day before the launch indicated the four pound payload should travel almost due east of Denver (actually 95 degrees azimuth), and touch down about 88 miles from the launch site. An HF net was planned for 7233 kHz, and local coverage would be on Denver's 146.94 MHz 2 meter repeater. Even the weather forecast looked good: sunny and calm. Press releases were sent to the local newspapers and TV stations, and announcements were made on all of the local VHF/UHF nets as well as local packet BBS. Information was posted on the USATVS Electronic Cottage Computer BBS, and I was featured live (via telephone) on the Kansas City ATV repeater a couple days prior to launch. Everything was coming together nicely, and it looked like nothing could possibly go wrong.

Well, Murphy did strike--Jack, our project leader, wound up in the hospital three days before the launch was to take place! He was released Saturday (it wasn't too serious, thank goodness) and was able to participate in the launch he had worked so hard putting together. I'm convinced that Jack was our "Murphy sacrifice," since everything else went almost by the book!

"Another SPEC-COM Exclusive Article!"
(No one else got the Photographs)

Come Sunday morning our HF net started promptly at 8:30 AM MST, with a little background information on WVN and the balloon launch. At 9:00 AM the VHF net started, providing local coverage of the pre-launch activities. We actually began filling the balloon with helium at 8:45; a decent crowd was already forming at Robert F. Clement Park in Jefferson County (located in Denver's southwest suburbs), and by launch time at 9:30 AM--right on schedule, by the way--we had a crowd of about 75 people on hand.

Just before the launch, final payload checkouts were performed, and all was in working order! The balloon had been filled to about six feet diameter, the payload internal power activated, and the whole thing launched to a cheer from the crowd. One of Denver's TV stations (Channel 2) was there videotaping the event, and our launch made the 9:00 PM local news that night.



Picture quality from the balloon was excellent, and the package took off almost straight up since there wasn't even a breeze at launch time. Climbing at an approximate ascent rate of 1000 feet per minute, we had beautiful pictures of the Denver metro area. A couple hams from Atmospheric Instrumentation Research (who provided the balloon and helium) monitored payload telemetry, which was being transmitted on the ATV signal's audio carrier. We had readouts of payload internal temperature, outside temperature and altitude.

After the balloon passed through 92,000 feet, we could no longer receive the telemetry signal from the ATV transmitter, although all other signals were still receivable. The balloon continued to climb for another five minutes or so, reaching an estimated 97,000 feet when the balloon burst. At that altitude we had a predicted 13 state coverage on ATV and 2 meters; we received a report of video reception in Oklahoma City. The 2 meter beacon also was heard in Oklahoma City, as well as Albuquerque, Los Alamos, and parts of Texas and Utah. The 10 meter beacon proved to be the DX winner: Its QRP signal was heard nationwide!

Chase crews were monitoring the descending payload's signals, with some heading for the predicted touchdown area. As luck would have it, the package actually went another 40+ miles, landing about 132 miles from the launch site. Its traveled azimuth (96 degrees) was very close to what was predicted. Unfortunately, when the payload hit the ground, the 2 meter antenna folded under the package and could no longer be received! Stations on the east coast informed us on 40 meters that the 10 meter beacon was still going, however. We couldn't pick up the ground wave signal, so one of the airplanes came back to pick up a shortwave receiver.

Three planes were involved in the search, one piloted by non-ham John Berkstrom, the second by John Waterman WAØRLC, and the third by Vince Lawrence NØUA. Paul WB3JZV and Tim WBØTUB were on the third plane with Vince, and using a Sony 2010 receiver located the downed package. They guided ground crews to the site, and final recovery occurred just after dark. If not for the 10 meter beacon (added to the payload almost as an afterthought just a few days before launch), we probably wouldn't have recovered the balloon!

We learned quite a lot from this launch, and WVN is already planning another one for next Spring. Perhaps one of the biggest surprises was the excitement among the non-ATV ham community. We'll likely gain some new members among the ATV ranks as a result of this, but more important, the non-ATV signals from the payload generated considerable interest. It allowed a lot of people to participate, and suggested that future such projects should cater to the general ham population in addition to ATVers. All in all, it was a truly FUN day!

If you've never promoted your ATV or other ham radio events with the local press, you can use the following press release as a guideline for providing newspapers, radio and TV stations with information about your group's activities. WVN sent this release to Denver media, and it resulted in local TV coverage of our balloon launch. (Note: your actual press release should be double spaced.)

November 12, 1990

Denver ham operators to send TV-equipped balloon to the edge of space

For more information contact:
Ron Hranac (303) 770-7700
Tim Armagost (303) 795-9683

For immediate release

Ham radio operators are usually noted for providing two-way radio communications for public service events and disasters, but members of Western Vision Network--a Denver-based radio amateur group--use *television* to contact one another. On Sunday, November 18 at 9:30 AM, the group will send a TV-equipped balloon to the "edge of space." A special high altitude weather-type balloon will be launched from Robert F. Clement park in Jefferson County, and a tiny TV camera on board will transmit live pictures back to hams on the ground from as high as 100,000 feet.

The six-foot helium balloon is expected to grow to a diameter of about 25 feet before bursting nearly 20 miles up. The camera and TV transmitter will parachute safely to the ground, continuing to send pictures as far away as 400 miles. A second group of hams will track the balloon and its payload during the ascent and descent, listening for a Morse Code homing "beacon" being transmitted along with the camera's images.

Radio amateurs can use special channels in the ham bands to transmit TV just like local broadcast stations do--minus the commercials, of course. Western Vision Network uses that capability to send live pictures of severe storm activity to the National Weather Service, and members of the group can often be found at area walk-a-thons and other public events providing visual communications for activity coordinators. According to Tim Armagost, Director of WVN, "Amateur TV is just one of the many modes of communications used by ham radio operators. It allows us to go beyond the usual voice contacts; we get to see who we're talking to." He added that the public is invited to watch the balloon launch Sunday morning.

RF Limited's VC-300 Opens Doors to Data Record Capability!

Versatile Transceiver Great for Simplex Repeater, Identifier or Message Maker.

Exclusive SPEC-COM "Review" by Mike Stone WB0QCD

VC-300 Digital Audio Recorder.

New Digital Data Recorder/Player Offers Neat Applications for Repeaters & Remote Transmitters

The VHF/UHF airwaves are becoming more interesting to listen to every day with the interfacing of digital speech identifiers, repeater status indicators or key-up voice wattmeters. Several issues ago, SPEC-COM ran commercial advertising for one of the first truly programable, digital recorders released on the market from RF LIMITED in Issaquah, WA. Last summer, the MATS ATV Group in Maquoketa, Iowa, ordered and received one of the advertised VC-300 digital audio recorders to be used on their ATV Repeater & Remote Transmitter System. The unit was interfaced, works well and here is a quick report.

The VC-300 (priced under $300) is not just a board with assembled parts like similar systems that many other companies offer. The unit looks like any 2 Meter transceiver, enclosed in a very professional metal case with a 4-pin microphone connector and all kinds of other jacks and controls. Special digital-code squelch circuitry allows the recording of outside stations in unattended operation. Microphone audio mixing circuitry enables the user to "mix" at proper levels. Two units are required for complete duplex controlling.

The audio quality capture and reproduction is nothing less than superb! The VC-300 captures "natural" sounding voice or sound. It does not sound like a monotone voiced computer. Words spoken into a microphone (not supplied) come back clear in the personality of the users voice patterns. You cannot tell the difference between a recorded transmission or a "live" one. At the MATS ATV system, we interfaced it to both 2 Meters and our 4.5 MHz TV FM audio subcarrier. Eight, short, distinguishable messages rotate in sequence upon PTT activation (PTT line can be wired into any touchtone decoder for remote controlled operation). An option is available for up to one, over a minute long message or record/playback message. We opted for the shorter messages used for FCC ID, LOCATION OF THE STATION, SYSTEM INFORMATION, ACCESS, NEXT MEETING and other such messages. Of course we custom programmed a "sexy" female voice to give our system even more "class"!

FRONT PANEL CONTROLS (top left to right): 1. Miniature LINE IN jack. Mix others sources with michrophone. This is where a 2 Meter, VHF/UHF rig or audio tape recorder (for non-michrophone programing) would be connected. This circuit has automatic 0.3 to 1 volt input tolerance levels. 2. DC POWERUP button with LED status indicator. 3. RECcord push button switch with LED status indicator. 4. CODE push button switch (for duplexing with another unit) with LED status indicator. 5. PEE push button switch (for selecting ON/OFF tail end "beeping" with LED status indicator. 6. MODulation LED status indicator. 7. ERASE previous message push button switch. Lower left, 8. 4-pin MIC jack. Pin-1 Ground, Pin 2 Audio, Pin 3 PTT and Pin 4 RCVR or AUDIO. 9. MIChrophone level control pot. 10. ECHO VOLume and 11. TIME delay control pots (of little use in our opinion). 12. MONitor gain control pot (audio output to external speaker) and 13. Audio MIX control.

The unit is powered by 11-15.0 Volts DC. User must supply voltage. CODE NUMBER DIP switches located on the back of the unit, allow the custom programing of several options. Switch 7 determines RAM TIME. S7 ON gives the highest quality reproduction performance and OFF records slightly less quality but DOUBLE the RAM time. Up to 8 IC memory chips can be installed. The unit comes with one. One chip provides 8/16 + seconds record time (S7). Extra chips can be purchased for $10 each and can be installed at the factory or by the user at a later time. Michrophone impedance is 100-50,000 ohms. Size: 150 mm by 60 mm high by 190 mm deep. Weight is 1.5 kg. The VC-300 transceiver comes with a metal mounting bracket.

RF LIMITED's neat VC-300 digital data recorder/transceiver can be used in a number of useful functions. If long-play, 64-68 second mode is programmed (S7), it could be used as a "SIMPLEX REPEATER". Put the system (and a 2 Meter or UHF rig) at a high, centralized location and communicate back and forth. Gone from the car or shack? Record your monitored frequency or leave a message for someone else to retrieve. Need to leave a message for the XYL or kids (or they to you)? Talk to it. The most practical use of the VC-300 however, appears to be in the use of it as an identifier or message sender. We found it quite interesting to experiment with the VC-300 unit using other than voice modes of communications. We "captured" 2 Meter, 8-12 and 36 second COLOR, ROBOT-1200 type SSTV signals (pictures) from Merle Reynolds W9DNT 40 miles away. These images captured and recorded perfectly and REPLAYED perfectly when sent back to W9DNT. Next we tried RTTY. Perfect captured and replays of 60 and 100 WPM baudot signals (*). Batting a thousand, we tried PACKET just for the heck of it. It worked! Playback of a minutes worth of captured (monitored) 145.01 MHz signal bursts spilled the characters in normal fashion on to the computer screen (* fed back into an AEA PK-232 TNC). What a unit! What possibilities!

If you are interested in one of these types of devices, give the good folks at RF LIMITED a call and tell them this "SPEC-COM" article sent you. Ask for Vic Tiscareno or Sam Louis. Vic is the TECH and Sam the owner. Both nice people. Write for brochure or catalog of products to: P.O. Box 1124, Issaquah, WA. 98027. Phone: (206) 392-0399 or 392-0419. 73's de WB0QCD

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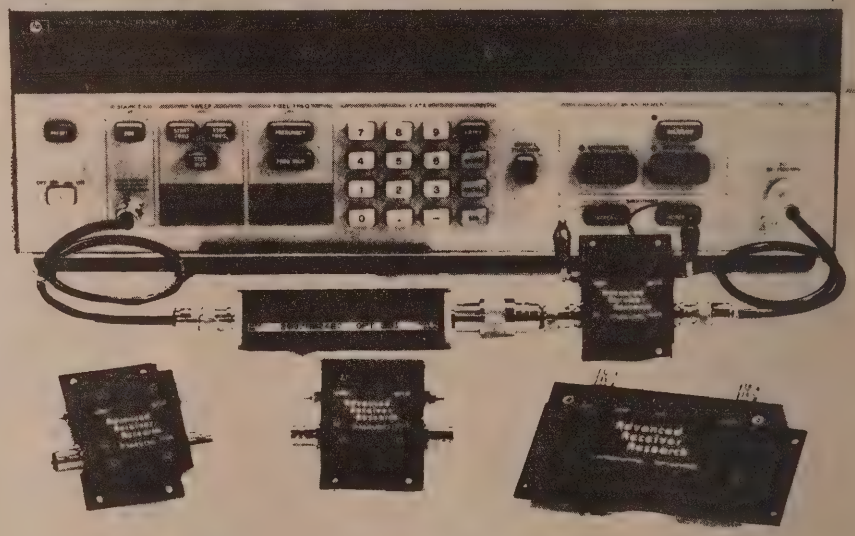

Receive Only	Freq. Range (MHz)	N.F. (dB)	Gain (dB)	1 dB Comp. (dBm)	Device Type	Price
P28VD	28-30	<1.1	15	0	DGFET	$29.95
P50VD	50-54	<1.3	15	0	DGFET	$29.95
P50VDG	50-54	<0.5	24	+12	GaAsFET	$79.95
P144VD	144-148	<1.5	15	0	DGFET	$29.95
P144VDA	144-148	<1.0	15	0	DGFET	$37.95
P144VDG	144-148	<0.5	24	+12	GaAsFET	$79.95
P220VD	220-225	<1.8	15	0	DGFET	$29.95
P220VDA	220-225	<1.2	15	0	DGFET	$37.95
P220VDG	220-225	<0.5	20	+12	GaAsFET	$79.95
P432VD	420-450	<1.8	15	−20	Bipolar	$32.95
P432VDA	420-450	<1.1	17	−20	Bipolar	$49.95
P432VDG	420-450	<0.5	16	+12	GaAsFET	$79.95
Inline (rf switched)						
SP28VD	28-30	<1.2	15	0	DGFET	$59.95
SP50VD	50-54	<1.4	15	0	DGFET	$59.95
SP50VDG	50-54	<0.55	24	+12	GaAsFET	$109.95
SP144VD	144-148	<1.6	15	0	DGFET	$59.95
SP144VDA	144-148	<1.1	15	0	DGFET	$67.95
SP144VDG	144-148	<0.55	24	+12	GaAsFET	$109.95
SP220VD	220-225	<1.9	15	0	DGFET	$59.95
SP220VDA	220-225	<1.3	15	0	DGFET	$67.95
SP220VDG	220-225	<0.55	20	+12	GaAsFET	$109.95
SP432VD	420-450	<1.9	15	−20	Bipolar	$62.95
SP432VDA	420-450	<1.2	17	−20	Bipolar	$79.95
SP432VDG	420-450	<0.55	16	+12	GaAsFET	$109.95

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Advanced Receiver Research

PLEASE MENTION THIS AD IN THE SPEC-COM JOURNAL

Box 1242 • Burlington, CT 06013 • 203 582-9409

It's Time For The Annual USATVS "SPRING ATV QSO PARTY" CONTEST!

This One Is Designed For "FUN" and Family Involvement

You Can Even Invite The Neighbors Over For This One!

Starts: FRIDAY MARCH 15th 0001 Local Time
Ends: SUNDAY MARCH 17th 2400 Local Time

We have always tried to be responsive to the requests of our valued Membership. Many of you wrote to us (or called) after our highly successful FALL N.A. ATV DX CONTEST, that you didn't want to wait another whole year to work another FSTV contest. OK, we listened and here is our nutty response!

A-N-N-O-U-N-C-I-N-G, a "new" ANNUAL Fast Scan TV Mode CONTEST with a different sort of twist emphasizing "LIVE", in front of the Camera contacts! We are always deadly SERIOUS in our fall long-distance DX annual event. Its' SPRING (or close to it) so lets get a bit C-R-A-Z-Y with this one OK? We'll give you 72 total WEEKEND operating hours; beginning at 0001 (local time in your area) on Friday March 15th and lasting until the stroke of midnight (2400) on Sunday March 17th to make as many "live" (no dead ones or fake videotaped transmissions please) FSTV QSO's as you can on 70 and 33 CM (and higher UHF/Microwave bands) in recognized ATV operating areas.

SCORING: (Hang on to your hat, here we go) 100 points awarded for making ANY Black/White, AM or FM, two-way, Amateur TV Video CONTACT (per band)! One-way VIDEO contacts (where only one person sends and another receives) is permissable but at only a 50 point reduced score for both stations. 50 point COLOR BONUS! 50 point TV AUDIO (not 2 Meters this time gang) BONUS!

10 points.

Additional points (no videotape or life-size photo Tom Foolery): XYL or YL in front of Camera waving HELLO or other immediate FAMILY members (kids living at home or elsewhere (includes adopted) = 10 points (per person). RELATIVES (mom, dad, in-laws, grandparents, brothers and sisters, aunts and uncles, cousins, nieces and nephews, etc.) and ANYONE ELSE (friends, neighbors, other Hams, the UPS man, a preacher, an enemy, man or woman from the street, ex-wives, lovers, girl-boy friends (careful), other friends of family members, etc. that you can get to hold still in front of your Camera. [This might be more difficult than you think after several QSO's!]

If your wife (XYL or YL) looks anything like the RADIO ELECTRONICS Magazine beauty with the camcorder shown to the right, get her "on-air" and let others decide. If they agree, send us a "look'a'like" photo (come on now - be honest - we'll deduct if you lied) and add 50 points! In fact, send us a photo of yourself "working this contest" and give yourself an additional 25 points! Wait, (oh no) there's more!

5 points

What about the family (K9?) dog or cat? OK as long as they are alive and moving! We're not about to get hit with a species prejudicial lawsuit so yes, Goldfish (or any type of fish that you can hold the bowl full of up to let others see) counts too. So to for Rabbits, Hamsters, Gerbils, Mice (that you can catch), Ferret(s), Weasles, Turtles - whatever you call a pet that lives in your home where your shack is located and you (or someone else) can get in front of your ATV camera! Yes, Ants count also but you must have a MACRO LENSE and make sure that the other guy can tell the difference between all of them (1 point each - 25 points max. - geez.). One exception: Positively without any exception, NO snakes allowed. We hate snakes.

Got all that? Lets recap:

INITIAL CONTACT	COLOR	TV AUDIO
100	50	50

PEOPLE	PETS	(Ants)	BEAUTY	URPHOTO
10	5	1	50	25

Who else would bring you such a historic event to waste your time? Who would want to? Aw come on, be a sport and give it a try. Or at least get on-the-air and give out a few points to others working the contest. Imagine the entertainment, the laughter, the silliness, the congestion!

Yes, ATV Repeaters can be used and of course simplex as well. We'll what are you waiting for? Pass the word. Make a copy of this page and insert it in your next ATV Newsletter! Official LOGSHEETS are available at our MAIN OFFICE. Let us know how many you need. Unofficial logsheets will be accepted. Send entries by March 25th DEADLINE DATE to: ATV QSO PARTY CONTEST, c/o SPEC-COM Communications & Publishing Group Ltd., P.O. Box 1002, Dubuque, Iowa 52004. Awards and results presented at our DAYTON ATV WORKSHOP sessions. Now get out there, be creative and HAVE SOME FUN! -WB0QCD

"If your XYL looks like this,
you shouldn't be working the contest..."

UNITED STATES ATV SOCIETY (USATVS)

Constitution and By-Laws

Originally Drafted January 1983 by Mike Stone WB0QCD
Amendments made July 1984, March 1985, February 1987 and October 1990.
Published to the General Membership in DEC 1985 and JAN/FEB 1991 Journal Issues

PREAMBLE (Title, Purpose, Functions)

We, the present members (attached is a roster of 1,485 names), wishing to secure for ourselves the pleasures and benefits of the Association of persons commonly interested in the hobby of Amateur "Ham" Radio Specialized Communications, do hereby constitue ourselves to be officially known as "THE UNITED STATES ATV SOCIETY", known here after as The USATVS. It shall be the purpose of The USATVS to facilitate and educate at the national and international level of exchanges of video related electronic information, to establish standards, to legislate on behalf of, to ensure proper conduct, to protect and expand the ATV (Fast and Slow Scan TV, Facsimile) community, and to promote the use of ATV modes and the Amateur "Ham" Radio hobby in general.

ARTICLE 1, SECTION 1 - MEMBERSHIP (Applications/Eligibility/Acceptance)

(A) All persons of United States Citizenship, holding a valid FCC Amateur Radio operators license, who demonstrate interest in Amateur Radio "visual" specialized communications modes, who supports the published journal and/or The USATVS efforts or who is a member of a registered Affiliated Club or Group so recognized by The USATVS, shall become automatic members of The national USATVS organization.

(B) Those who wish to receive the journal publication or who are part of an affilated club or group but do not wish to be counted within The USATVS Membership, may do so via a written request.

(C) Those foreign subscribers to the published journal shall be counted as Associate Members of The USATVS.

ARTICLE 1, SECTION 2 - AFFILIATED CLUB/GROUP MEMBERSHIPS

(A) The USATVS welcomes any organized Amateur TV Club or Group to join and support USATVS efforts. All that is required, is that the issue to seek affiliation be brought up at a regular meeting, be voted upon with approval, a list of "members" complete with names, callsigns, addressses, etc. be forwarded to The USATVS for registration. One copy of each journal issue shall be forwarded to the affiliated club or group at each printing and all members shall be included in USATVS Membership tallies.

ARTICLE 1, SECTION 3 - MEMBERSHIP SERVICES

(A) The sponsoring organization shall create an easy access, MEMBERSHIP SERVICES in-house agency to handle the needs of the membership.

ARTICLE 2, SECTION 1 - RECOGNITION OF OTHER ORGANIZATIONS (ARRL)

(A) The USATVS national organization "officially recognizes" THE AMERICAN RADIO RELAY LEAGUE (ARRL in Newington, CT. as the MAIN spokesbody for Radio Amateurs in the U.S.A.. The USATVS vows its' support and promises to work with The ARRL in a positive and constructive manner on legislated issues. The USATVS seeks similar recognition from The ARRL as the main spokesbody for HAM-TVers.

ARTICLE 3, SECTION 1 - FINANCIAL UNDERWRITER (SPEC-COM Comm. & Publishing Group Ltd.)

(A) The financial, moral and administrative support of the national USATVS organization, shall be furnished by THE SPEC-COM COMMUNICATIONS & PUBLISHING GROUP Ltd., a registered Corporation in the State of Iowa, with Headquarters located in Dubuque, Iowa. One of the company's publications: The SPEC-COM Journal, shall be designated as "The Official Journal of The USATVS" and shall be so noted on the magazines cover. SPEC-COM Communications & Publishing Group Ltd. shall devote regular space for USATVS submitted material and activities.

(B) Since no actual dues is charged for membership in The USATVS national organization, financial disclosure information on the part of the sponsoring company is purely voluntary.

ARTICLE 4, SECTION 1 - OFFICIAL BBS DESIGNATION (EC BBS)

(A) The "Electronic Cottage Telephone Bulletin Board System" of Dubuque, Iowa (319) 582-3235 (maintained by Bill Fay KA0FDI) shall be designated as the Official HOME BBS system for The USATVS national organization. The sponsoring Company shall provide both moral and financial sharing cost of this project. This system shall be advertised in the journal publication as available for membership use.

ARTICLE 5, SECTION 1 - OFFICERS (Executive Staff, Regional Directors, State Section Mgrs)

(A) The USATVS shall be organized and governed by Members of the sponsoring Company Executive Staff, by Six (6) Regional Directors and Fifty (50) State Section Managers. A Mode Technical Advisory Group, Project Consultants & Committees shall be established to help The USATVS during the decision making process.

(B) All State Section Managers shall report to their Regional Directors as to ATV activity, QRM reports, Club, Repeater & Remote Transmitter information, members comments, etc. twice annually in January and July.

(C) All decisions and legislation enacted on behalf of The USATVS national organization, shall be approved by The Exceutive Staff and Regional Directors.

(D) Positions within the The USATVS national organization shall be appointed by The Executive Staff of the sponsoring company. Terms of Office shall be renewed annually with approved concurrent service periods.

(E) No Member of The USATVS shall be paid any "fee" nor receive any monetary value or gift for his/her appointed assignment. Members may be reimbursed for legitimate expenses as deemed necessary.

ARTICLE 6, SECTION 1 - KEY DIRECTIONAL COMMITTEES

(A) Special Key Directional Committees shall be established to aid The USATVS National Organization is making the best, informed, decisions on legislative matters. These committees shall be:

(1) Frequency Mode Protection
(2) Historical Preservation
(3) FCC, ARRL, AMSAT, NASA & Other Groups Liason
(4) Contest, Awards & Special Events
(5) ATV Workshops & Training
(6) Commercial Broadcast & Cable TV Liason
(7) Construction Projects
(8) ATV Repeater & RT Database Management

(B) The USATVS has the right to add additonal committess if necessary.

(C) Each Committee shall have an elected or appointed Chairman in charge of the groups action.

ARTICLE 7, SECTION 1 - LEGISLATION PROCESS

(A) To initiate action leading to possible legislation within The USATVS, any member may submit a written request letter regarding a particular situation or draft of a proposed docket for consideration via the normal chain of command or directly to USATVS Headquarters. In most circumstances (where time/action deadline is not a factor) the issue shall be timely considered, debated and commented upon by Staff, Regional, State Officials and if viewed proper and current, this proposal will be published in the organization journal for a public discussion "comment period". If the matter appears warranted by the Staff and/or Regional Directors, then a decision will be made as to necessary action or abandonment.

ARTICLE 8, SECTION 1 - MEETINGS

(A) All Executive Staff, Regional Directors and State Section Managers shall meet once per year at a date, time and location so designated (usually each year, the last week in April at Dayton, Ohio Hamvention). Part of this meeting must be OPEN to the general membership for questions or comments. Other meetings may be conducted during the year as well.

(B) Meetings by radio, television, telephone conference calls or other mediums is also permissable subject to advance notice to all voting Staff and Officials.

(C) ROBERTS RULES OF ORDER shall preside at all meetings. A simple majority vote is always required for legislative matters.

ARTICLE 9, SECTION 1 - DONATIONS

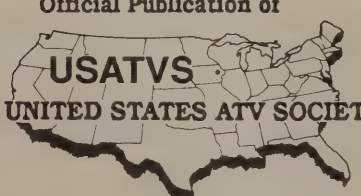
(A) The USATVS appreciates any and all voluntary donations of monetary or gift value. Donations made to The USATVS will be used strictly for USATVS work and accomplishments.

ARTICLE 10, SECTION 1 - AMENDMENTS

(A) Amendments to this Constitution & By-Laws must be done by a majority vote of The Executive Staff and The USATVS Regional Directors with intentions and results so published in the host journal publication for public comments.

THE SPEC-COM JOURNAL

Official Publication of



The UNITED STATES ATV SOCIETY

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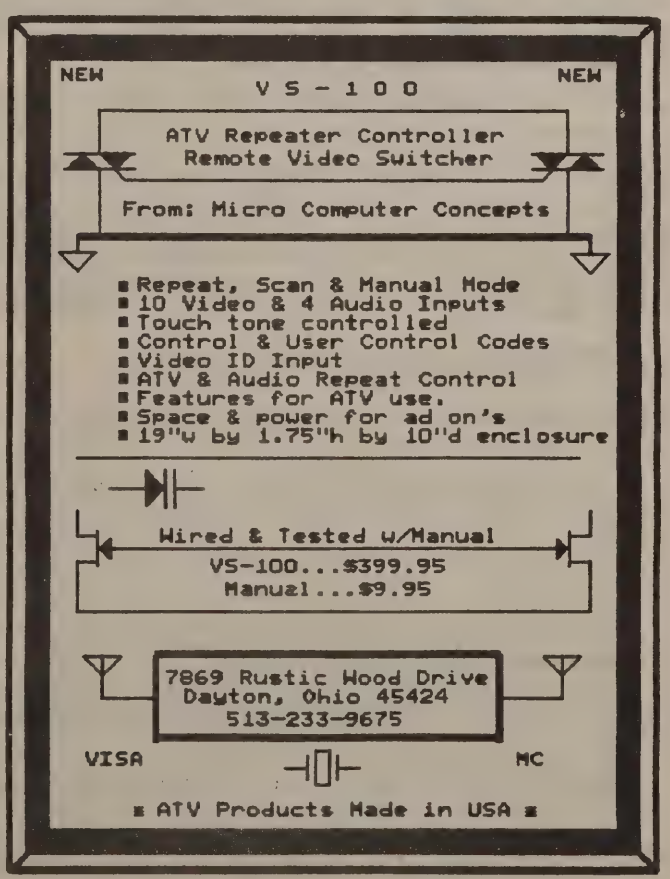

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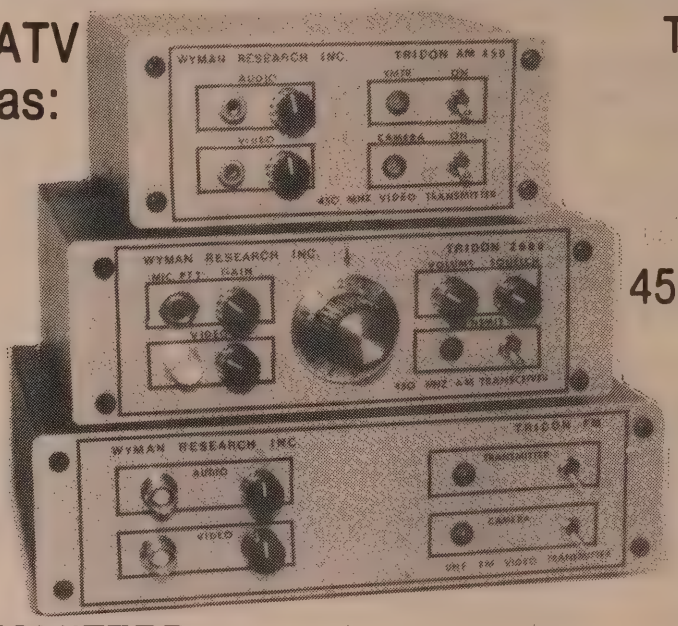

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RETUNED LSB DOWNCONVERTERS OFFER ANSWER TO UHF QRM PROBLEM

by Don C. Miller W9NTP - Waldron, Indiana

I can only try to explain why FM voice repeaters and links are operating in the same part of the spectrum as simplex FSTV on 70 CM. The two modes are NOT compatible used in the same band area under conventional means. For those not familiar with the problem, let me attempt to describe the situation and problems as they exist today.

Contrary to the statements of others, most ATV simplex and repeater input receivers around the country are operating on 439.250 MHz. The USATVS National ATV Repeater Database now lists some 180 known systems here in the USA. FM voice repeaters were suppose to operate on Frequency Coordinated assignments from 444 to 450 MHz. In the past few years however, pressure mounted and permitted operation below 444 MHz was tolerated (and in most cases even encouraged) by supposed "watchdog" Frequency Coordinators. Today, FM voice systems have improperly encroached down closer to the years ago, agreed upon wideband ATV portions to 442 MHz and even lower. **USATVS investigations uncovered the existance of FM operations in some areas down as far as 438 MHz.** It appears some volunteer Frequency Coordinators could care less about HAM-TV operations in their area and are now faced with a real dilemma with the popularity of ATV soaring and when UHF operators buy FSTV gear and want to get on-the-air. WB0QCD in past editorial comments, has been quite correct when he states ATVers allowed this to happen to ourselves when no strongly organized voice or lobby group complained loudly enough to the right people (except maybe ourselves) about this matter from the period 1970-1982. Some ATV Groups simply gave in easily and chose with poor leadership to shift operating frequencies without hardly even a battle for "their" abused rights. Now these groups operate unfavorably in the eyes of the FCC and right smack in the middle of the internationally recognized and protected AMSAT OSCAR SSB and PACKET ranges unacceptable as a viable answer to the problem. Since the formation of the USATVS in 1983, a direct, untiring effort has been committed in trying to lessen the severity of these problems. I am glad to report that some progress has been made in this area.

While the slow political process continues, I think I may have one answer to solve these FM QRM problems that plagues ATVers across the country. Since most ATV Hams are using commercial television receivers, the normal mode of operation is to detect only the upper sideband of an ATV station. The lower sideband is rejected by the passband of the television receiver. Different TV sets have slightly different passbands so sometimes it is possible to tune the downconverter so that both sidebands are received. Usually the color and sound are very bad when this is done.

Problems exist when ATV and FM repeaters operate in the same spectrum. This is not an isolated problem. It exists in every part of the USA today and most likely, unless there is a dramatic turnaround in thinking and policy by Frequency Coordinators and Regional Governing bodies, it will only get worse. Many FM users know that their signals encroach and cause severe interference to nearby Fast Scan TV signals and quite frankly, they could care less. We must continue to put up with this unfortunate situation or find some way to get along the best we can.

Here in Indianapolis, this problem is a real dilemma. If one of our harmonics (2 X 3.58 or 4.5 MHz) falls on a repeater input - it will turn on the repeater and cause interference. For this reason, we are all turning off our sub-carriers and/or using ON-CARRIER or 2 meter only audio "talk" coordination. We are now experimenting with some new thinking and ideas that seem to work.

Let's first examine the critical frequencies in the upper sideband of an ATV signal. The main video carrier is at 439.250 MHz. The color burst and color spectrum is centered 3.58 MHz higher or specifically at 442.830 MHz. The normal subcarrier sound is located 4.5 MHz higher at 443.75 MHz. These critical frequencies may be located at or very near an improperly place FM system. Needless to say, if a repeater turns on in the vicinity of these frequencies, the color and sound is eliminated. Now the video spectrum extends from the main carrier to at least the color subcarrier so the luminance information too is bothered by an FM repeater in this upper sideband area.

There is hope. A very simple solution to the problem exists and I am surprised that everyone on ATV has not found this solution on their own. FIG 1. shows the spectrum as transmitted by most ATV transmitters. Remember that the lower sideband is rejected by the TV set which has a passband dictated by spectrum conservation in the 1940's. All radios and TV sets are superheterodyne in design. This means that it is more efficient to heterodyne or beat an incoming signal to a common IF frequency so that all the amplifier stages will not need to be tuned when going from station to station. Radios started to be superheterodyne in the late 20's and 30's. TV sets are no exception. Most have 40 MHz IF amplifying systems. Commercial television is transmitted on the upper sideband. In order to use an outboard downconverter on a commercial TV set, it is necessary for the local oscillator in the downconverter to have its oscillator on the lower sideband in order to simulate the reception of a commercial TV station which always transmits in USB. This is shown in FIG 2.

As as example, assume that you would like to use a downconverter to receive an ATV signal on 439.250 MHz on a TV set tuned to Channel 3. Ther frequency of Channel 3 is 61.25 MHz. The local oscillator in the downconverter is tuned to LSB or at 439.250 MHz minus 61.250 MHz (378 MHz) so that there will not be an inversion of the incoming signal. The TV set thinks that it is receiving a normal Channel 3 signal. For those who are more familiar with the internal workings of TV sets, the local oscillator inside the TV set is on the high side so the IF receives an inverted spectrum signal (this is actually of no importance to the discussion but mentioned as background understanding).

When we are on ATV, most of us are on both sidebands simultaneously. This is true whether we intend to or not since even the upper sideband vestigial transmitters suffer so much bandspreading when amplified that unless a filter is put just before the antenna, it is a foolish endeavor. **Since nobody likes our upper sideband, why don't we abandon the use of it altogether?** The lower sideband is not used and no one is complaining about it being there. If we use LSB - we can then tolerate FM repeaters.

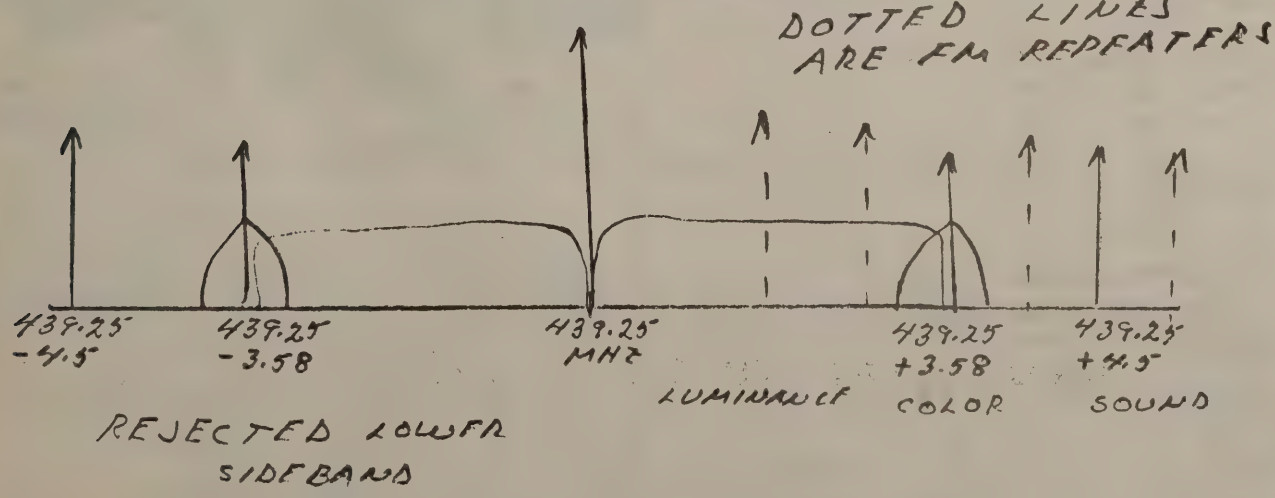
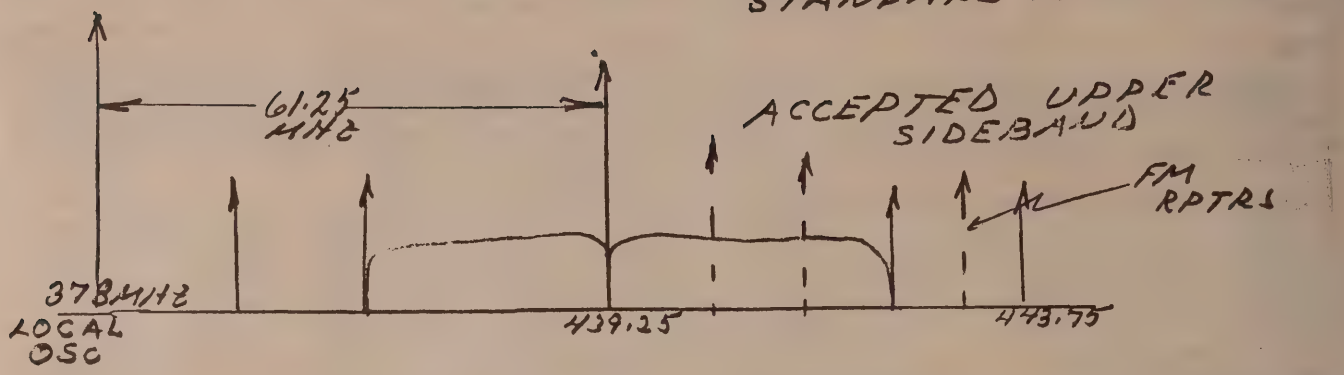


FIGURE 1 SPECTRUM OF ATV

FIG. 2
STANDARD ATV RECEPTION



As mentioned, many years ago, the Indianapolis ATV Repeater has this problem. At this time, there was only one or two FM repeaters in town. One was owned by the trustee of the ATV repeater! The output frequency of this voice repeater was on 443.750 MHz. This is as you know, the sound subcarrier for the ATV repeater input. This was certianly, one of the worst case possible situations that could ever be imagine (right on the same tower). One day, while traveling along the highway. I was talking with W9JIY about this problem. We arrived at a complete solution in minutes that only cost the ATV repeater a few cents. Our ATV repeater receiver was crytsal controlled. The solution was easy. Put in a crystal that puts the local oscillator in the ATV repeater downconverter on the lower sideband (500.5 MHz). **We were so excited, we didn't even wait to order a crystal!** W9JIY got busy and ground a crystal that night and the next day once installed, we got rid of the terrible FM QRM to the TV picture. WE later put in a filter that attenuated the upper sideband above 440 MHz since dozens of FM repeaters later crowded in on us. The lesson learned? Spending less than $15 for an ordered crystal can give peace with FM QRM problems.

FIG 3 shows again the relationship of the local oscillator and the ATV input spectrum. **There is, for the recommended use of retuning out the USB signal in downconverters, one warning however. Any company selling vestigial sideband transmitters must have the ability to switch sidebands or face NOT being useable in an area utilizing removed USB procedures.**

Finally, lets talk a bit about simplex ATV operation. If the lower sideband channel is agreed upon by many or all to be used in a given area, all receive downconverters must be modified to receive lower sideband. This is just the matter of making a simple screwdriver adjustment of the local oscillator capacitor or coil in the downconverter itself. Most ATV Repeaters output frequency is on the upper sideband so this means that the modified downconverter must be sideband switchable or a second downconverter used for receiving the upper sideband of the ATV repeater. This output is usually on the upper sideband since it is operating in the extreme low end of the 70 CM band. There is no problem in using the upper sideband in the low part of the spectrum.

The original SILVERNAIL ATV downconverters detected the lower sideband (ahead of its time?) so if you are lucky enough to have one of these units, you already own a receiving system that eliminates USB FM QRM. Maybe that's why you haven't seen the problems? When I bought out Mike Silvernail's compnay and redesigned my own WYMAN DC-1 downconverters, I placed them back on USB like other systems. **Beginning January 1st 1991, WYMAN RESEARCH now offers a new marketed unit that is "sideband selectable" so that the ATV operator can have the advantage of interference free simplex operation as well as full repeater receive capability.**

I hope this idea helps to lessen or eliminate all together ATV QRM interference problems, make us video enthusiasts more compatible to live with our band-sharing FM friends and makes Fast Scan TV operations more FUN and enjoyable like it should be all the time! - 73's Don Miller W9NTP

[Editors Comments: Don - thanks for this important, thought provoking article. Readers comments and opinions, PRO or CON, are always welcome in the pages of The USATVS Journal. That is what it is here for. -WB0QCD]

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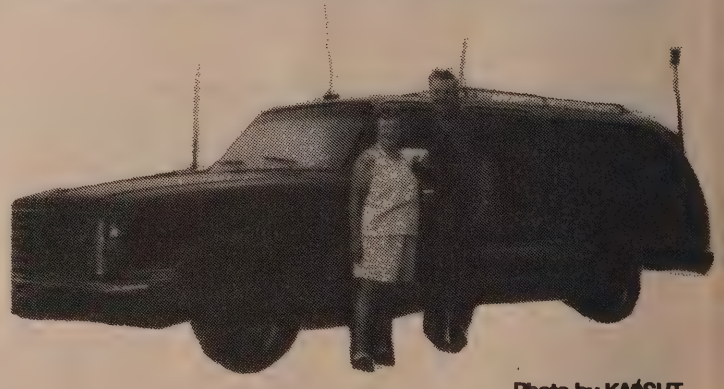
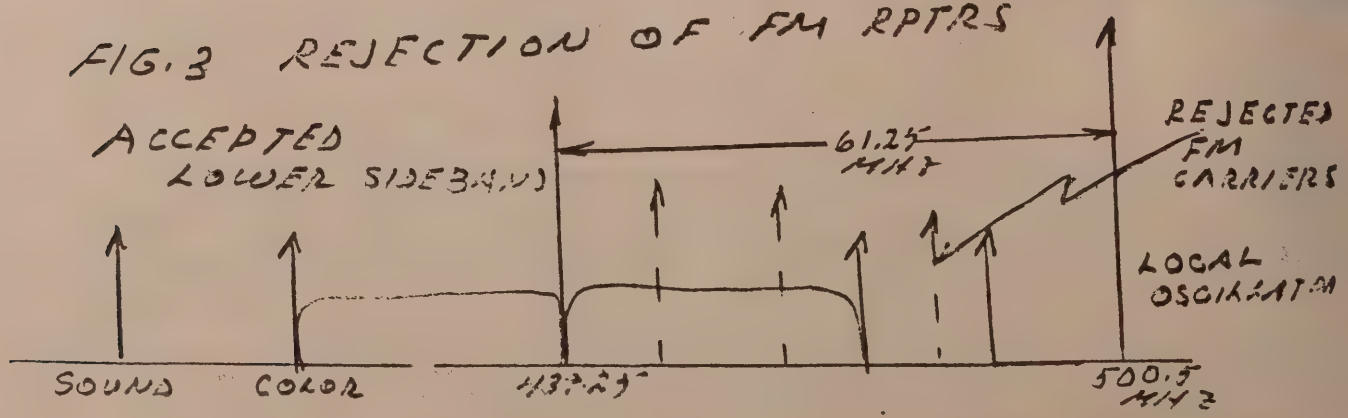


Photo by KA4SUT

FIG. 3 REJECTION OF FM RPTRS



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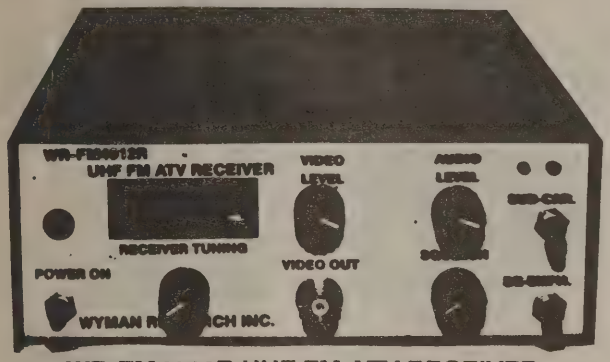

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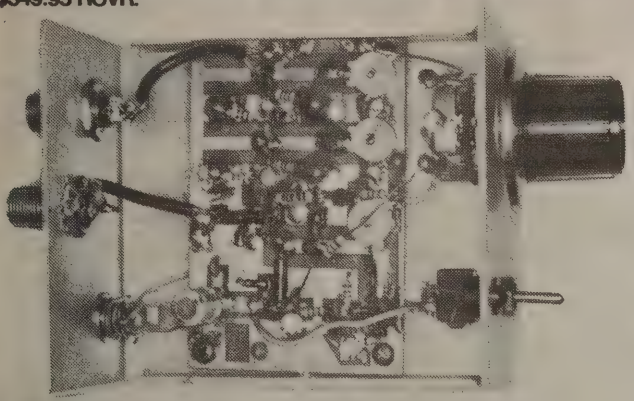

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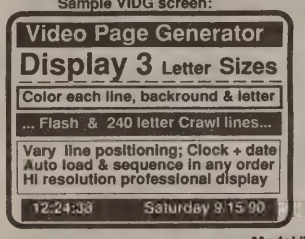
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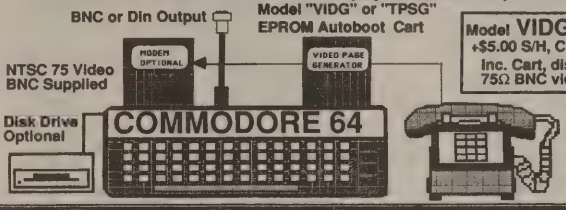

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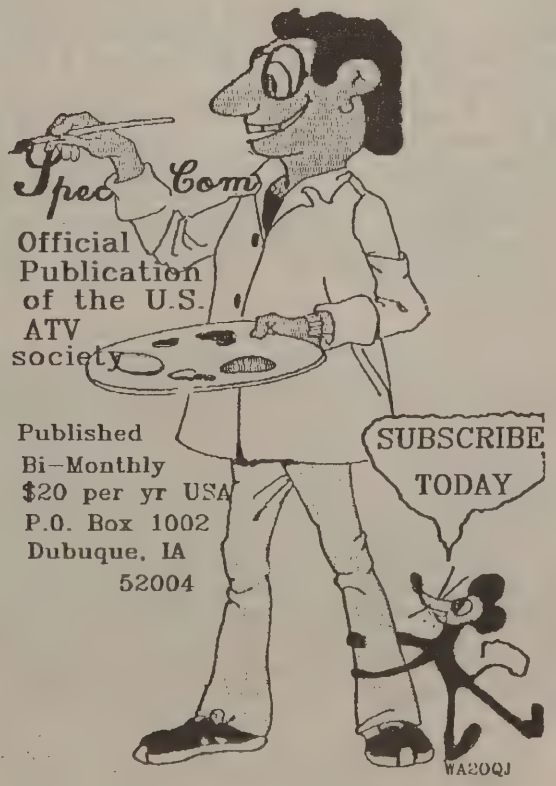


Build a microstrip preselector filter for the P.C. Electronics TVC12G 23 cm downconverter

By Ron Hranac, N0IVN

The P.C. Electronics 23 cm downconverter is a low-noise GaAsFET design that employs conventional single conversion to provide reception of 23 cm ATV signals on Ch. 8 (181.25 MHz video carrier, 185.75 MHz audio carrier). This rather unconventional output requires a downconverter local oscillator range of about 1058 to 1118 MHz to tune the 1240 to 1300 MHz amateur band. Unfortunately, the image frequency range (2 x I.F. below the desired signal) that the TVC12G is susceptible to interference from is 877 to 937 MHz, which includes part of the cellular telephone band, paging and business communications, as well as the 33 cm amateur band.

Most of the time this won't be a problem. But if you live within a few miles of a transmitter in the 877 to 937 MHz range, you may be a candidate for image interference, because the P.C. downconverter does not have a built-in preselector filter in its front end. I ran into just that problem, since I live only two miles from a cellular telephone site. In my case, I had interference in my received picture. At least one other ATVer in the Denver area experienced the same trouble, but even worse: He could also *hear* the phone conversations on his TV! After he reported successful elimination of the problem by the addition of a homebrew 23 cm bandpass filter between his antenna and downconverter, I thought I'd try the same remedy.

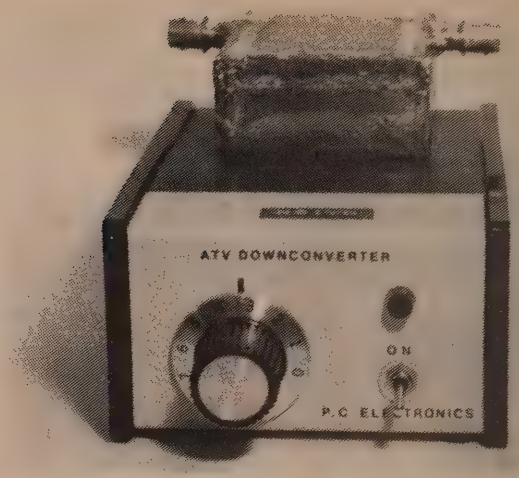
I decided to try my luck with a microstrip filter. The design is based on information presented in an article by John Kristiansen in Hewlett-Packard's 1st quarter 1989 "Bench Briefs," a service information newsletter. In that article Kristiansen discussed the theory behind microstrip filters, and presented a couple experimental designs. I opted for a four-pole ungrounded quarterwave bandpass filter (Figure 1).

This design is very easy to build, requiring only a small piece of 1/16th inch thick G-10 (or equivalent) epoxy fiberglass printed circuit board with copper cladding on one side, some adhesive-backed copper tape, an X-ACTO knife, a straight edge, a couple connectors (I used BNC chassis connectors), and something to measure small dimensions accurately (a vernier caliper works well for this).

Construction

Start by cutting a piece of G-10 circuit board to 2-7/16 inches wide by 3-1/8 inches long; remove any rough or sharp spots from the edges. Using a straight edge and something sharp, scribe (don't draw!) a fine line down the center of the fiberglass side. This will serve as a guide so that you will be able to line up the quarterwave strips. At this point, you may want to clean any fingerprints or other residue from the board with alcohol so the copper tape will stick better.

Cut six pieces of copper tape the same length (3-1/8 inches) as the board, and using a straight edge, X-ACTO knife and the vernier caliper, *very carefully* trim each piece lengthwise to a width of 0.097 inch. This dimension is critical for best VSWR and insertion loss performance. Next cut each of the six strips to a length of 2-3/4 inches.



Begin the layout by removing the backing from one of the strips and then carefully position it on the board following your scribed guide line. Repeat this procedure for three more of the strips, leaving a space of 0.05 inch between each of the adjacent strips (see figure). The two remaining strips will be placed perpendicular to each of the two outside vertical strips for connectorization. They should be 9/16 inch down from the top of the four parallel strips (trim any overhanging length flush with the sides of the board). Using a ballpoint pen or burnishing tool, rub all of the strips flat.

At this point lightly solder the connector strips to the two outer vertical strips. Now solder each connector's center conductor to the connector strips, and the connectors' shields to the copper cladding on the underside of the board.

Tuning it up

If you have access to a network analyzer or a spectrum analyzer and tracking generator, you can tune the filter by trimming the overall length of the four vertical strips from the bottom until you have centered the filter's frequency of operation where you want it. This design will have a 3 dB bandwidth of about 30 MHz, with a sharper cutoff on the high side. I found the optimum strip length to be about 2-5/8 inches, although your final figure may vary a little from this.

My filter had approximately 2.5 dB of insertion loss, and a center frequency of 1250 MHz. The spacing between the strips and their overall length will play a big part in determining these figures. I measured just over 30 dB of insertion loss at the downconverter's image frequency, which was enough to eliminate the interference I was experiencing.

After I tuned my filter, I built a small box around it out of remaining G-10 circuit board, soldering all the edges together. The final result, while not particularly fancy looking (this is *amateur* radio, you know) works well. It's about the size of a pack of cigarettes; I glued it to the top of my downconverter, and installed a short 50-ohm coax jumper between one of the filter's connectors and the TVC12G's input.

If you have been experiencing interference with your P.C. Electronics 23 cm downconverter, this filter may just cure your problems. Of course, if you are picking up in-band interference, the filter's bandwidth is too wide to help that.

Ron Hranac N0IVN may also be contacted by message on the SPEC-COM/USATVS sponsored ELECTRONIC COTTAGE National Telephone BBS at (319) 582-3235 [8-N-1]

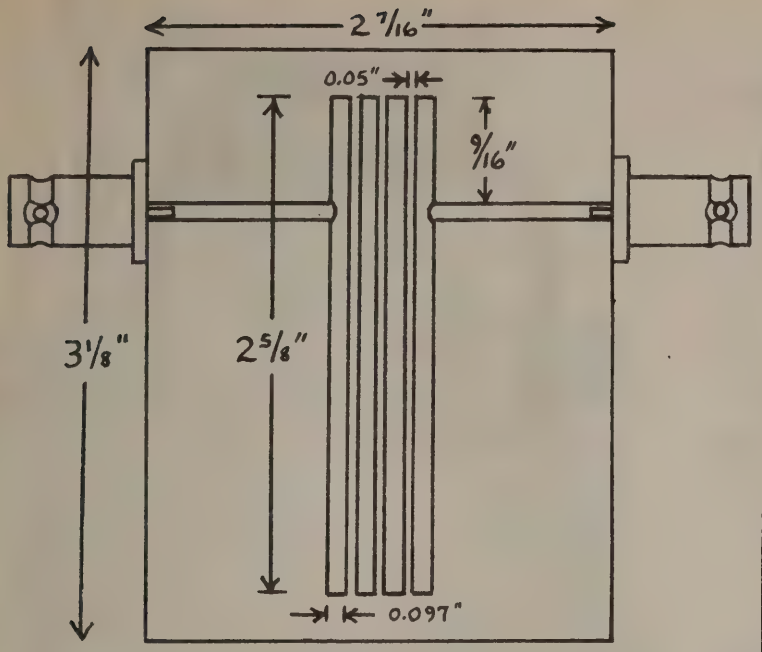
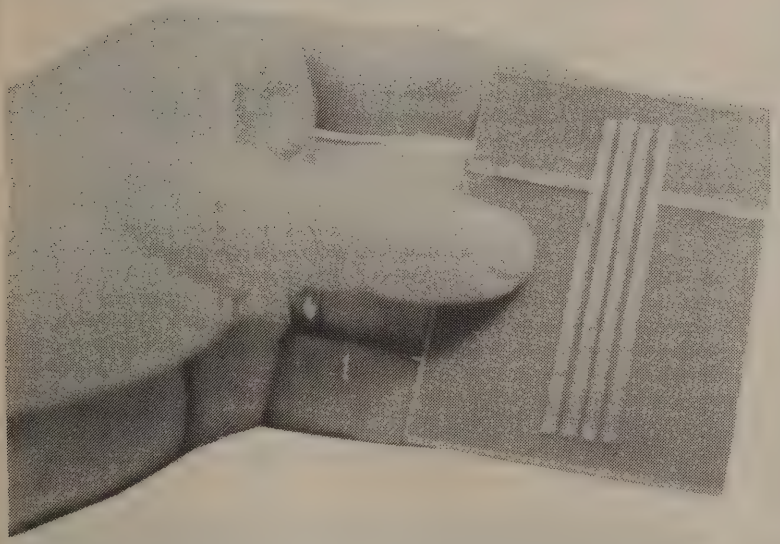


Figure 1



Good luck on the project. If you have any further questions, drop me a line or give me call. By the way, my **promised** TECHNICAL review comparison of ALL presently manufactured FSTV transceivers here in the USA (AEA, PCE, T.D. SYSTEMS and WYMAN) has been completed and will appear in the next (MAR/APR '91) issue of The SPEC-COM Journal. I guarantee it to raise a few eyebrows. You won't want to miss reading it! Pass the word that it's coming... -N0IVN

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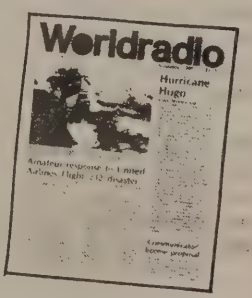

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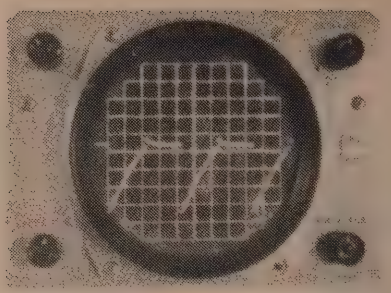
How to measure video levels with an oscilloscope



By Ron Hranac, N0IVN

Adapted with permission from "How to set video levels with an oscilloscope," January 1988 *Communications Technology*

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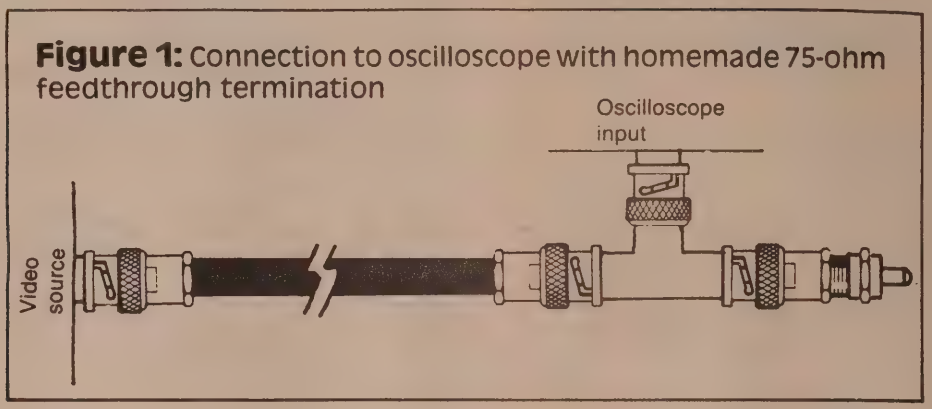
Figure 1: Connection to oscilloscope with homemade 75-ohm feedthrough termination



The oscilloscope is a versatile piece of test equipment that has many uses in the ham shack. One very important but relatively simple use for ATVers is video level measurement.

A common misconception about video measurements is that a waveform monitor must always be used for accuracy. Waveform monitors, while certainly valuable in a studio environment, are nothing more than specialized oscilloscopes with features dedicated to video applications. On the other hand, the general purpose oscilloscope is capable of most waveform monitor duties in addition to a host of other tasks. Table 1 shows the relationship between waveform monitor IRE units and their equivalent oscilloscope peak-to-peak voltages.

For an oscilloscope to be used for video measurements, it should have at least 5 MHz bandwidth; greater bandwidth is even better. While not mandatory, video triggering--both field and horizontal line--is a useful oscilloscope feature. Delayed sweep can help with individual video line measurements. One extremely important thing to remember about using a general purpose oscilloscope for video measurements: The impedance of the oscilloscope is not the same as the video source being measured! An oscilloscope has a very high input impedance--typically around 1 million ohms. Most video sources have a 75-ohm impedance. Because of this, you must use a 75-ohm feedthrough termination at the input of the oscilloscope when measuring video signals.

Terminating the input of the oscilloscope can be accomplished two ways: You can use a commercially made 75-ohm feedthrough termination or you can make your own with a BNC "T," a BNC-to-F adapter and a conventional 75-ohm F terminator. Put the F terminator on the adapter, then install the adapter on one leg of the "T." Connect your video source to the other leg of the "T," and the remaining leg of the "T" to the oscilloscope input (see Figure 1).

Making measurements

To make video measurements:

- Turn on the oscilloscope and let it warm up for 30 minutes. Check to make sure that all knobs are in the CAL position, and verify calibration per the manufacturer's directions.
- Remove the oscilloscope probe from the input BNC connector (most probes are X10; the oscilloscope should be in a direct or X1 mode).
- Install your 75-ohm feedthrough termination on the oscilloscope's input BNC connector and connect the video source being measured to the termination.
- Adjust the oscilloscope's controls to the following settings:

Vertical sensitivity (volts/division)	0.2 V
Sweep rate (time/division)	5 ms
Trigger	TV field
Coupling	DC

(If your oscilloscope does not have field or video triggering, use line triggering. This will lock the instrument to the AC power line.)

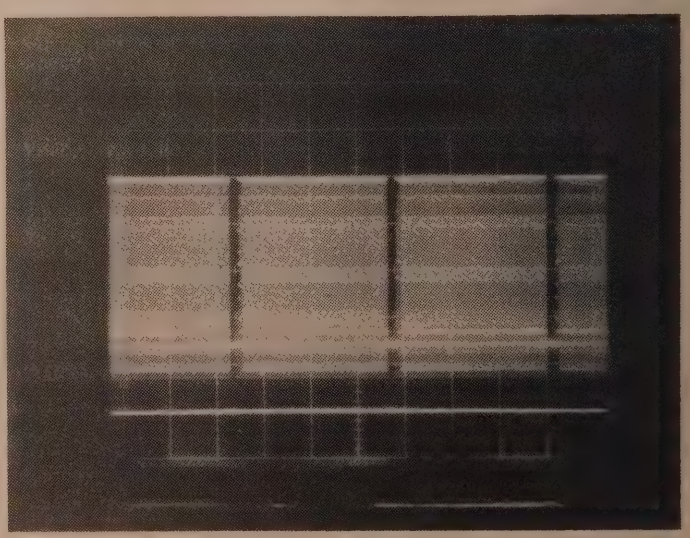


Figure 2

Center the displayed video signal with the vertical and horizontal position controls. Then, using the vertical position control, adjust the position of the video signal on the oscilloscope CRT to align the sync tips of the video with a graticule near the bottom of the display.

Adjust your video source until the oscilloscope indicates 1 volt peak-to-peak, or five vertical divisions from sync tips to peak white (Figure 2). If you don't use a 75-ohm feedthrough termination for this procedure, the oscilloscope will indicate a much higher video level than is actually present (Figure 3). Conversely, if the video source has been terminated somewhere else prior to the oscilloscope, a double termination condition exists, and the video level will appear much lower than it actually is.

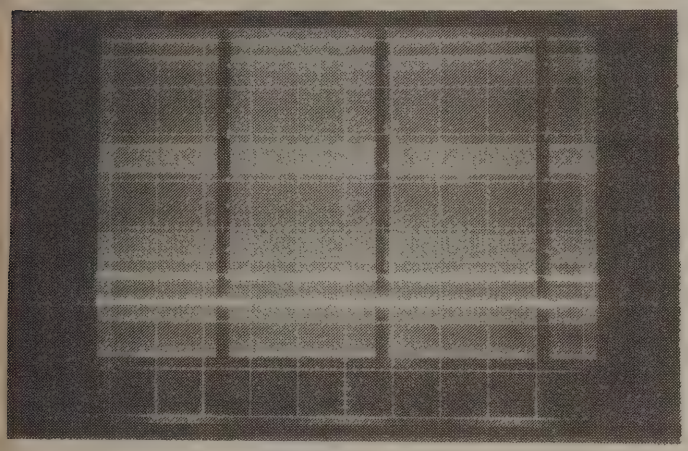


Figure 3

If you want to look at horizontal blanking to measure the color burst or horizontal sync, readjust the oscilloscope's horizontal sweep (time/division) control to 20 5s, and the trigger to TV horizontal or video line. It may be necessary to play with the oscilloscope's variable trigger control to stabilize the display, but you should get something that looks like Figure 4.

A properly calibrated oscilloscope with a stable video trigger circuit will let you measure video parameters usually left to be handled by a waveform monitor. With a bit of practice, you'll soon find it's not too difficult to measure setup, sync timing, pulse width, burst amplitude and even some common video distortions.

Proper video levels are an important part of good ATV transmissions, particularly in repeater operation. Using the right tools and techniques to set and maintain video levels will help to ensure that such things as FM ATV transmitter deviation and AM ATV transmitter depth of modulation are where they should be. The bottom line will be better ATV pictures.

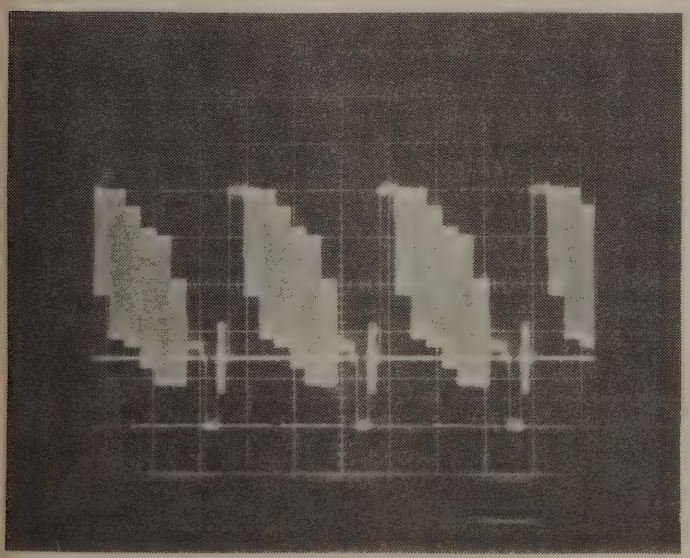
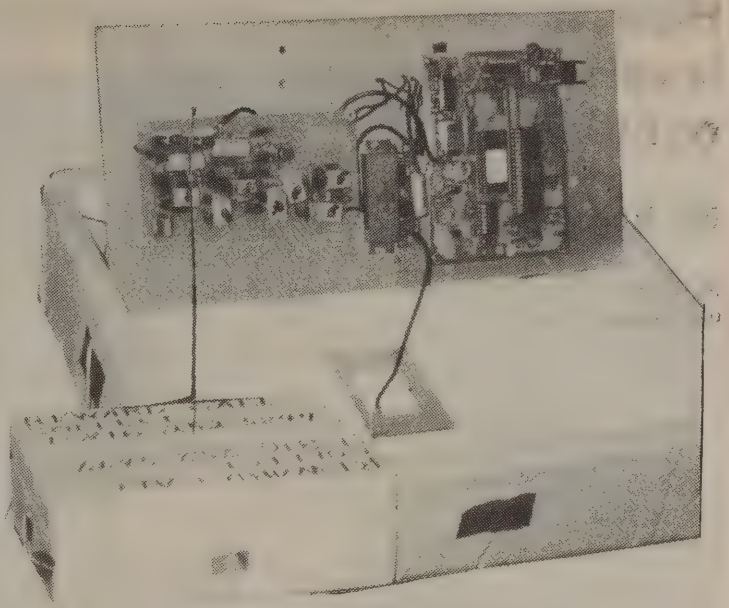


Figure 4



SPECIAL KANSAS CITY, MO ATV CLUB BALLOON FLIGHT & HAMFEAST UPDATE!

Submitted by Dale Lam WA0NKE
USATVS Kansas State Section Manager

The Kansas City Amateur Television Group was busy during the month of October preparing for two big events. The first was the launch of a two meter transmitter hunt balloon by Mike - KD0FW at 9:00 AM. The second event was the HAM FEAST PICNIC, which started at 2:00 PM. Both events were held on October 20, 1990, in support of each other. The weather was threatening to be cold and rainy all week long, before the picnic on Saturday. Luckily, the rain held off at the picnic site except for a few light sprinkles. We had a wonderful time with all of the club families and ate great hamburgers cooked at the picnic by Ken - W0UKL. A large selection of salads, beans, potatoes and other dishes that were brought from home. KG0R - Gary brought ATV gear that received the weather radar on 426.25 Mhz. This let everyone watch the rain squalls move past the K.C. area while we were at the picnic site. He was surprised, when setting up the receiving antenna, to find that the best signal was received when the antenna was low to the ground, rather than on top of the 20 foot mast. UHF will always provide us with new curiosities.

The balloon launch occurred on Saturday morning at about 9:00 AM. Mike - KD0FW used a small 3 foot diameter balloon and a light weight flight package with only a two meter FM voice transmitter on board. The idea behind the flight was to have a short flight of maybe 30 to 40 minutes duration that would be a fun challenge to the "T" hunters. The winning team would be given free tickets to the HAM FEAST PICNIC. The launch occurred on time and the transmitter worked great. The hunters headed out towards the Northeast, which was the predicted flight path, but they soon realized the balloon was getting ahead of them. They raced down the country roads in an attempt to keep up. After an hour the balloon was still up and flying away. The signal was lost eventually, and no one was near enough to hear it once it was on the ground. After searching all afternoon, the tired hunters returned home without package. Plans were immediately worked out for Mike - KD0FW to fly in a light plane on the next day. From the plane he would be able to cover a much larger area and have a height advantage over ground based hunters. His flight lasted about four hours, but no signal was heard. The package is still waiting to be found.

An interesting note about the flight came from Mike Stone - WB0QCD. He said that while he was writing at his computer on Saturday morning Oct. 20, he had his two meter receiver monitoring the 144.34 Mhz ATV voice simplex frequency. All of a sudden the squelch began to break just like a DX ATVer was trying to call. The signal got loud enough for him to hear the words "This is the KD0FW hidden transmitter. Come and find me.". He didn't know a "T" hunt was scheduled, but recognized the call. He decided to call KD0FW on the phone, to see what was going on. Of course KD0FW was out of the house chasing the balloon, so Mike Stone left a live recording of the digitized voice beacon on Mike's phone recording machine. Later that evening many of the K.C. ATVers enjoyed hearing the recording, when KD0FW replayed through the local two meter FM repeater. Maybe Mike - KD0FW should visit Mike - WB0QCD who lives Northeast of Kansas City, and look around his farm for a missing balloon? -WA0NKE

Grab your wallet. Here comes a new generation of HI-RES Video Printers!

Introducing the new Seikosha VP-1500 Video Printer.

Review by Mike Stone WB0QCD

The clarity and resolution of finished pictures from VIDEO PRINTERS has come a long, long way in just a few short years. Remember a few years ago (in A5 before SPEC-COM) where we first announced in our pages a new gadget called the video printer released in Japan by MITSUBISHI and yet "denied" by the manufacturer here in America of even its' existance? We did the first electronics magazine review of a video printer. Several photos were published on how to get the neat little unit working for VCR, TV, Camera and ATV applications. Today, newer version updates are available just about anywhere. The good people at HENRY RADIO out in California picked up the line here stateside and can be called for additional information concerning lower cost video printers.

Our last issue front cover pictured SEIKOSHA's new Model VP-1500 unit (same photo as above). We promised a review and here it is. First a word about the company. SEIKOSHA AMERICA INC. is part of the SEIKO GROUP Company. The USA headquarters is located at 10 Industrial Avenue in Mahwah, NJ 07430. Two company officials have been most responsive and helpful to us: Mr. Wayne J. George is Director of Marketing/Communications. Mr. Paul Fenster (position not exactly known) was our second contact. They both can be reached at either 1-800-338-2609 or (201) 327-7227.

SEIKOSHA manufacturers and distributes at least two models of video printers that I know about and several other models of computer dot-matrix type printers. One has what I would consider VERY GOOD resolution and gray level texture imaging and the other (of course more expensive) is rated with EXCELLENT "snatch and grab" reproduction quality. Now allow me to point out, that the two models I am about to talk about - may not be considered price wise to be in the budget ball park for the average amateur video hobbyist. These are serious priced printers usually sold to industrial, government and business accounts. The VP-1500 unit I am reviewing today, lists for $1,995.00. Now we all know what "list" means - it varies considerably from one company to another. The higher resolution model VP-3500 lists for a mere $6,700.00 (how many do you want shipped C.O.D. to your mother-in-law's address?). The "real" price that you might be able to get these units for, especially the VP-1500, might be considerably less so shop around and ask.

Yes, they are expensive. There are some other brands and models of video printers at a lot less price. Many of these are in the $500-$1,500 price range and would be quite suitable for the "Ham" or "Video Shack". You get what you pay for and in this case - this means RESOLUTION. If you want to be serious about very high quality reproduction - you might check out the models I mention being offered by SEIKOSHA. Are you into WEFAX IMAGE RECEPTION or how would you like to go back through all those VCR tapes of ATV-DX activity and print sheets full of your contacts? What I did with the P50 unit I had a few years ago, was to print out a ton of FSTV-DX captured images and then take them to a copy store, reduced them down and paste them up in a scrapbook about 20 to a page (the thermal paper back then eventually faded away in light - I understand it has much better retention now). There are a number of obvious "play" applications for this device and some much more serious such as in the medical, lab test or criminal justice field. Need some extra cash to pay off the bank loan? You might even make some weekend money at the mall selling instant photos!

SEIKOSHA has a national dealer distribution center by the name of CODONICS at 1-800-444-1198. These are the people to contact to actually buy one of these units. They ship worldwide. Call for details.

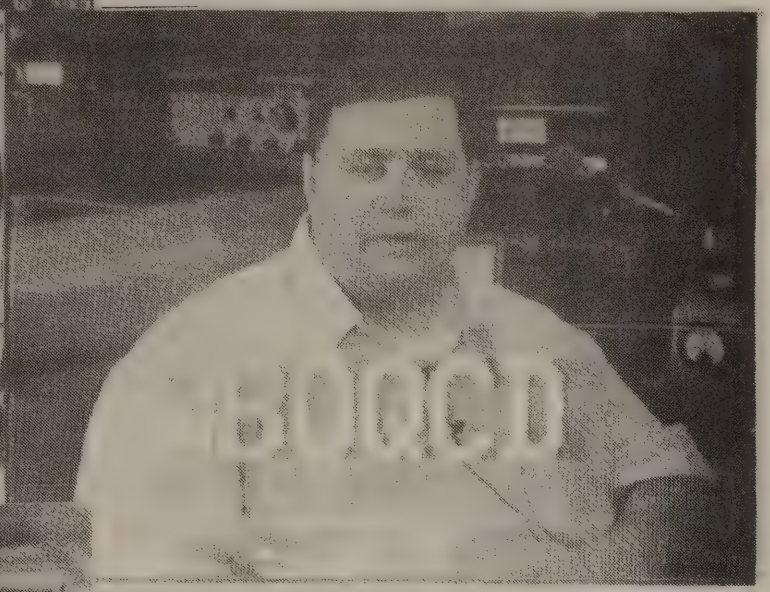
The SEIKOSHA VP-1500 is the first thermal video printer to combine 256-tone gray scale with a 5 second printout speed. It accepts signals from virtually any composite, separate, analog RGB, seperate RGB and other video sources. Actual printouts (see photo page) measure 3 1/4 X 4 1/4". SPECIFICS: Print Density; Horizontal-12 dots/mm (300 DPI), Vertical-6 dots/mm (150 DPI). Maximum HI-RES; 1,360 dots (H) X 640 dots (V). Print Time; 5 or 9 seconds. Grey Shades; 256. Cabinet Dimensions; 211 (W) X 113 (H) X 355 (D) mm. Weight; 4.8 kg.

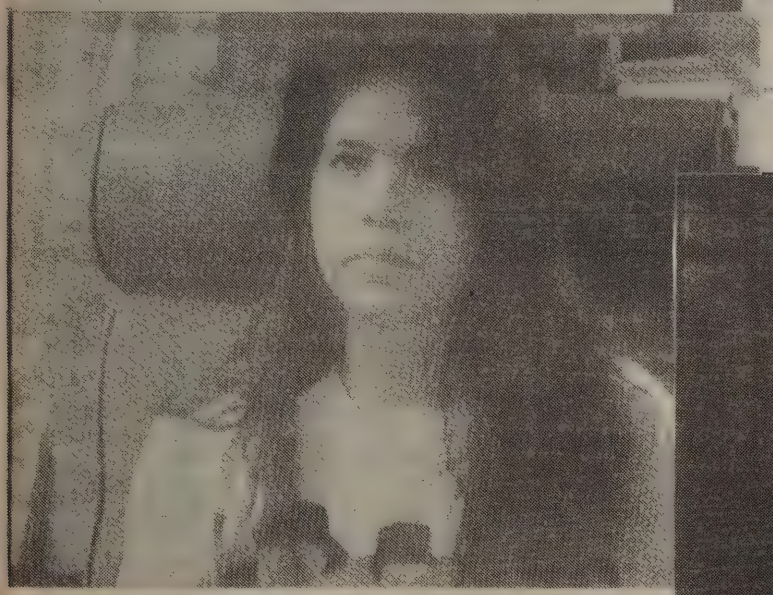
The SEIKOSHA VP-3500 deluxe unit is the highest line rate available resolution video printer on the market at 1280 (H) by 1240 (V) resolution with full 64-tone gray scale. Unlike the VP-1500 unit that prints small hardcopies, the larger VP-3500 prints out full-page sequences. Picture printing time varies from 26-48 seconds dependent upon the density desired. Since this unit is unpractical and/or unaffordable by most hobbyists, I won't go into any further specifics. Full color brochures on both units are available from either SEIKOSHA or CODONICS.

The VP-1500 has a neat FUNCTION SELECT PAD cable attachment. It controls things not selectable from the front panel control buttons. The front opens up and the roll of thermal paper loads quite easily. Front panel internal controls include: Contrast, Sharpness, Rotation and Reverse Imaging. Captured pictures can be printed one on top another, sideways to each other or reversed. Right side front panel controls include: Print key, Paper Feed, Duplicate Photo key and AC Power swicth. All kinds of LED's are available as status indicators. A remote key terminal jack is provided. The remote switch itself however, is optional and does not come with the unit. A wide variety of connectors and control switches are located in the rear of the unit. Special signal programming modes are available for Monochrome TV (B/W) PAL or

ACTUAL CAPTURED PICTURES USING SEIKOSHA VP-1500 PRINTER

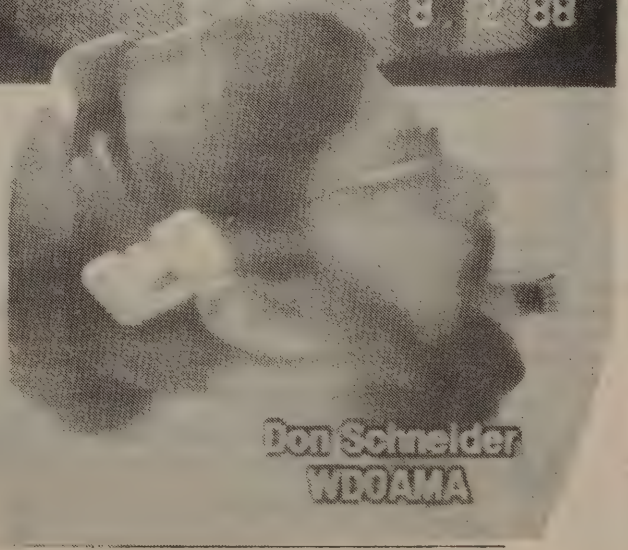
Top 3 photos showing good grey levels were taken from an aging Panasonic WV-3100 Color Camera in Sharp Density mode. Bottom 3 photos were injected from a Sylvania VCR recorder off VHS videotape. WB0QOX photo demonstrates line breakups which is fault of recording or tape not the printer.





Wendy Stone, daughter of WB0QCD

Shown photos are actual size. Some quality reproduction differences exist due to magazine reproduction screening.

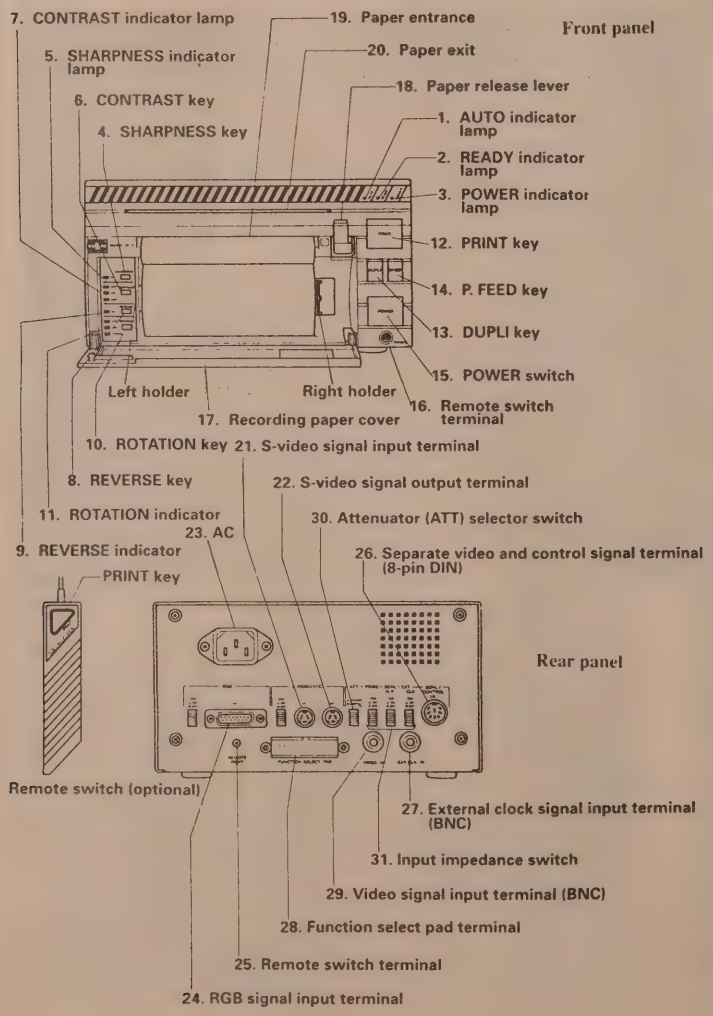


NTSC, Color TV or VCR, S-video cassette recorder, IBM PC/AT EGA or VGA and Test Instrument.

PERSONAL OPINIONS & OBSERVATIONS: The VP-1500 VIDEO PRINTER performed as expected with one slight hitch. It might very well be that I just wasn't running it right or it shuts itself down for protection (cooling) if run too often. I admit I was cranking out a couple hundred pictures in just a few hours time. In all fairness, I had only a couple days to play with it before shipping it up to my partner KA0JAW for him to play with it before we both had to return the unit back to the factory. Maybe Mike's experience will be different? Every so often, the unit seemed to "lock up" and not print out on command. It was no big problem. A simple POWER down and up reset everything and it worked fine after that for quite some time.

The unit is expertly constructed, smaller than pictured and is quite attractive with an off-white (computer type) plastic coloring. Rolls of paper run about $10.00 a roll. They come 48 to a case at a better price or they sell individually. I understand that there is a new higher grade of paper coming out on the market that is suppose to give even nicer looking pictures for about $15.00 a roll. Not too bad considering you get quite a few photos per roll.

The big objection to owning one of these babies is simply the price. It's awful expensive - even for my "I HAVE TO HAVE IT" elaborate tastes. If you've retired from a place like The South Carolina Education Television Network, John Deere, TMS, UNITED AIRLINES, EAGLE DOORS & WINDOWS, AEA, MIRAGE, COMMUNICATIONS TECHNOLOGY etc. and have got plenty of bucks to spend, by all means get one and have loads of fun! As nice as the pictures are however, I wouldn't go in hock for getting one. Maybe like everything else, the prices will come down for the rest of us still struggling to get by. Look what happened to VCRs, Computers and everything else in the fickle electronic industry. Someday, a video printer will probably be sitting next to everyones VCR in the living room. One warning if you've got kids. You had better keep the case of rolls of thermal paper under lock and key. My daughter (pictured) is 15 and of course she had to get the latest prints of NEW KIDS ON THE BLOCK - about 14 feet worth to be exact. -WB0QCD



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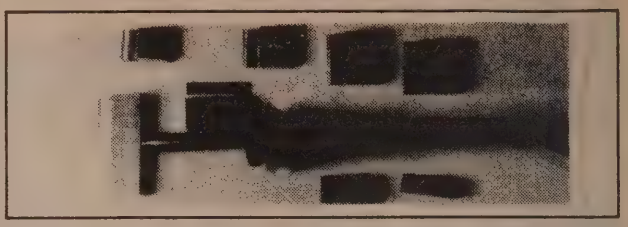

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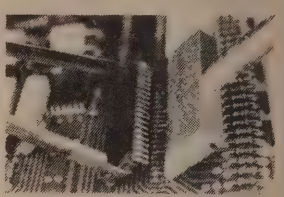
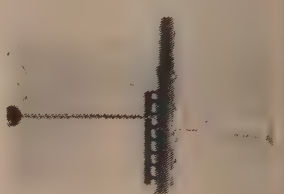


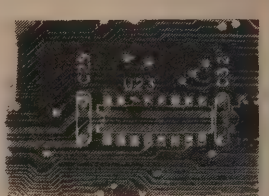
Step 1. Heat IC from top or bottom side. Remove one side of IC at a time, like you would open a book.

Step 2. Heat other side of IC and remove.

Step 3. Mop up excess solder on PC board with your favorite brand of desoldering braid, Solder Wick, or Archer, etc. Remove solder from a row of pins at a time with a strip of wick and the desoldering bit you just used to pull the IC with.



Step 4. Remove solder from plate through holes rapidly and cleanly by heating the holes and ramming a cold straight pin or safety pin of the appropriate diameter through the hole. This will give you a smooth clean hole to put the new IC or socket back into.



Step 5. Brush away solder flues left by pin and insert IC or socket. IC is **not damaged** by removal process and can be reused if it is not found to be the problem. Note what a nice job it does and no damage to the board. For simple anti-static operation for CMOS IC removal, a bare wire can be wrapped around the iron and clipped to your anti-static work station.

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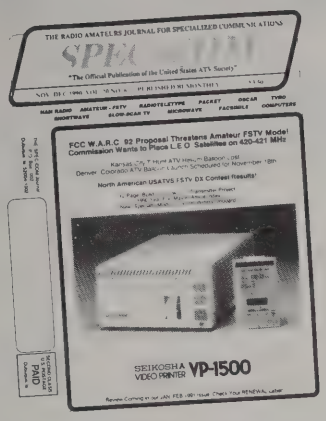

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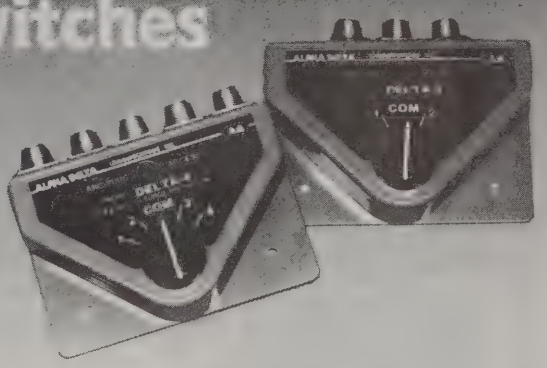
Setting "first in the industry" standards for lightning surge protection, precision low-loss switching and master antenna ground functions—all in a single, cost effective product.



- Arc-Plug® cartridge surge protection system—replaceable element provides continuous protection of the active antenna circuit. Unused circuits are automatically grounded. Easy access through front panel.
- Master antenna ground function—internally disconnects and grounds all circuits when in center "off" position.
- Efficient low-loss cavity design—uses constant impedance micro-strip construction for outstanding low-loss performance and state-of-the-art co-channel isolation. No lossy wafer switches are used.
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- Positive detent roller bearing drive for "no question" switch positioning.
- The Delta Series handles full legal power.
- Cheaper switches typically don't have N-type connectors because poor, non-constant impedance designs become obvious when using precision N connectors. One look inside cheaper switches will tell you they are still overpriced.
- Designed and produced in the U.S.A. by Alpha Delta.

Model Delta-2 (2-position, UHF connectors, 500 MHz) $49.95
Model Delta-2/N (2-position, N connectors, 1.3 GHz) $64.95
Model Delta-4 (4-position, UHF connectors, 500 MHz) $74.95
Model Delta-4/N (4-position, N connectors, 1.3 GHz) $89.95

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See Data Sheet for surge limitations.

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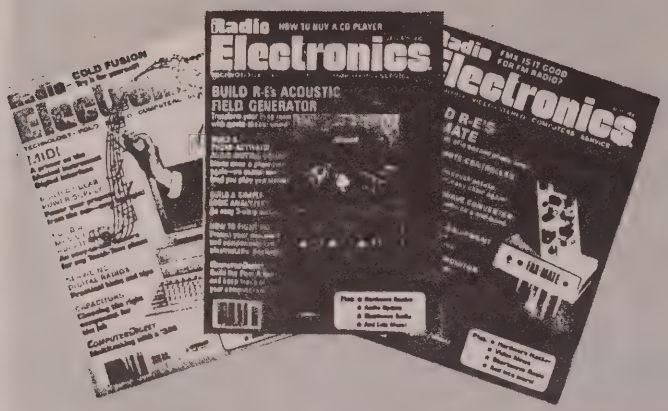

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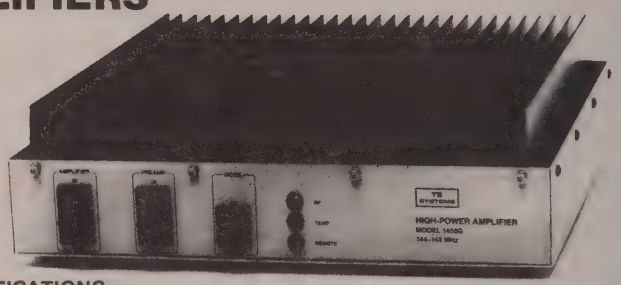

TE SYSTEMS new **HPA Series** of high power amplifiers now available through select national distributors.

All amplifiers are linear (all-mode), automatic T/R switching, and incorporate optional GaAs FET preamp. Amps are usable with a wide input drive level range. Thermal shutdown protection and remote control capability included. All units are designed to ICAS ratings and meet FCC part 97 regulations. Approx. size is 2.8 × 10 × 11.5″ and weight is 8 lbs.

Consult your local dealer or send directly for further product information.

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SPECIFICATIONS

Model	Freq. MHz	Power Input	Power Output	Preamp NF-dB	Preamp Gain-dB	DC +Vdc	Power A	RF Conn.
0550G	50-54	10	400	.6	15	13.6	60	UHF
0552G	50-54	25	400	.6	15	13.6	55	UHF
1450G	144-148	10	400	.6	15	13.6	54	UHF
1452G	144-148	25	400	.6	15	13.6	50	UHF
2252G	220-225	25	220	.7	14	13.6	36	UHF
4450G	420-450	10	175	1.1	12	13.6	34	N
4452G	420-450	25	175	1.1	12	13.6	29	N

Models also available without GaAs FET preamp (delete G suffix on model #). All units cover full amateur band – specify 10 MHz bandwidth for 420-450 MHz amplifier. Continuous duty repeater amps also available.

Amplifier capabilities: 100-200 MHz, 225-400 MHz, 1-2 GHz, Military (28V), Commercial, etc. also available – consult factory.

For our Model 4450 Series Hi-Power 175 Watt VHF Amp we recommend Astron's RM, RS-35 or 50 Power Supplies.

OVER 45,000 PK-232s SOLD!

The AEA PK-232 multi-mode data controller remains the most widely used radio data controller **anywhere.** More hams own the PK-232 than *any other* radio data controller. And AEA's hard-earned reputation for quality and service keeps them coming back. The '232 gained its popularity with features like these:

STATE-OF-THE-ART TECHNOLOGY.

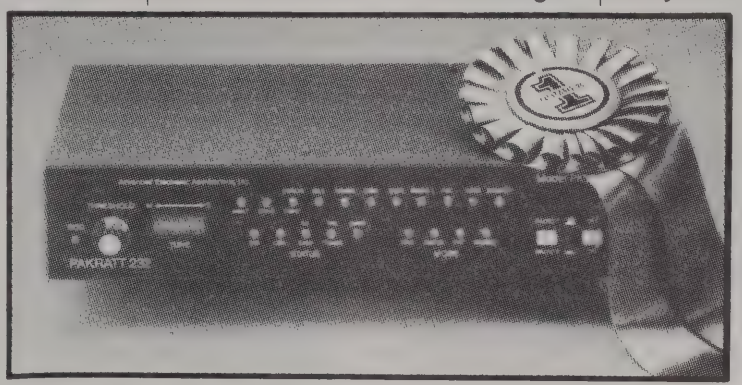
Since its introduction in 1986, the PK-232 has been updated **six times** to continue bringing you the breakthroughs. Six updates in four years! And even the very first PK-232 is upgradable to the latest model, with a relatively inexpensive user-installed kit. If you want a state-of-the-art multimode controller, you want the PK-232 MBX.

SUPERIOR FILTERING

The 8-pole Chebyshev filter in the PK-232 was designed from the ground up to work on HF **and** VHF. We didn't just add some firmware to a Packet modem to create our multi-mode. Our modem was **proven** superior by tests in Packet Radio Magazine over *all the others tested.* Read the fine print! You just can't beat the PK-232 for performance, quality and integrity. 45,000 PK-232 owners can't be wrong!

INNOVATION

The PK-232 has been the one to follow for technology advances. It was the *first* radio data controller with weather-fax, the *first* with Host mode, the *first* with NAVTEX, the *first* with Signal Identification, the *first* with TDM, the *first* with AMTOR v.625, the *first* with a WHYNOT command, etc, etc. AEA has always strived to "Bring You The Breakthrough," and while others have tried to imitate, only one can be the best.



The only data controller **designed from the ground up** to be a true multi-mode, the PK-232's tuning and status indicators work in all modes, not just packet. Make sure the multi-mode you buy isn't just a converted Packet TNC. There's only one number 1!

HOST MODE

Many superior programs have been written specifically for the PK-232 in Host mode language: **NEW** PC-Pakratt II for IBMs and compatibles, updated MacRATT for Apple Macintosh, and ComPakratt for Commodore C-64 and C-128 computers.

ALL DIGITAL OPERATING MODES.

The PK-232 MBX includes all authorized amateur digital modes available today...Packet, Baudot, ASCII, AMTOR/SITOR (including the **new** 625 recommendation) and Morse code, as well as WEFAX (receive and transmit). Other features include the PakMail 18K byte maildrop system with automatic normal and **reverse** forwarding, NAVTEX reception, KISS protocol support, binary file transfers and more. Also included is the TDM (Time Division Multiplex) mode for SWLing that few others have. No other multi-mode has all these features.

SIGNAL ANALYSIS.

The first multi-mode to offer SIAM (Signal Identification and Acquisition Mode) was, of course, the PK-232MBX. Indispensible to SWLers, SIAM automatically identifies Baudot, ASCII, AMTOR/SITOR (ARQ and FEC) and TDM signals, then measures baud rate and polarity. Once the PK-232MBX is "locked on" to the signal, a simple "OK" command switches to the recognized mode and starts the data display. You're even ready to transmit in that mode if applicable.
The PK-232MBX makes SWLing easy and fun, not difficult and frustrating.

REPUTATION

The PK-232MBX has helped AEA establish its hard-earned reputation for producing high quality amateur radio products. Anyone can **say** they have a good reputation, so it pays to ask around. Listen on the HF bands and see which multi-mode is getting *used*. You owe it to yourself to get the best possible value for your money. Don't settle for less!

Watch for the DSP-1232 and 2232 coming soon!

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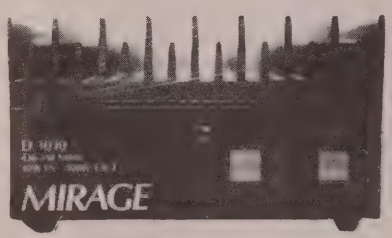

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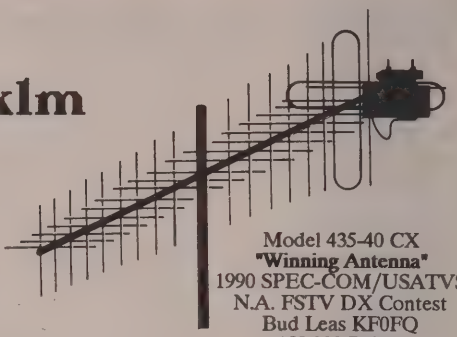

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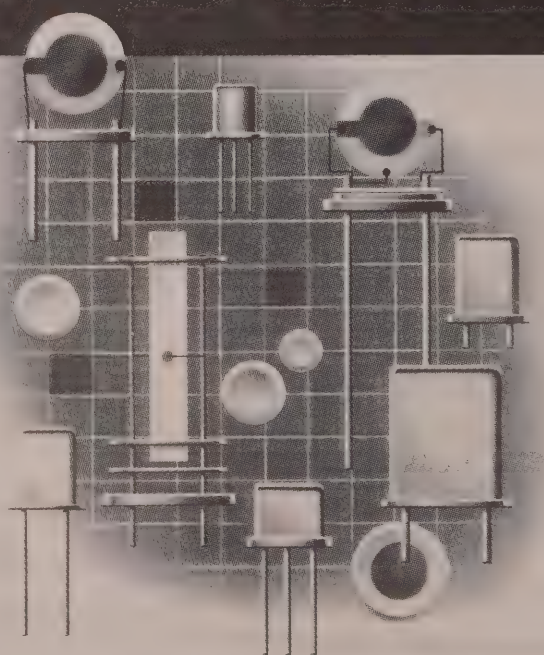

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"FROM THE WORKBENCH"

SPECTRUM ANALYZER PROJECT SUGGESTION

by Steve Franklin WB5KGL
2420 Superior Drive - Suite B
Pantego, Texas 76013
(817) 861-5864

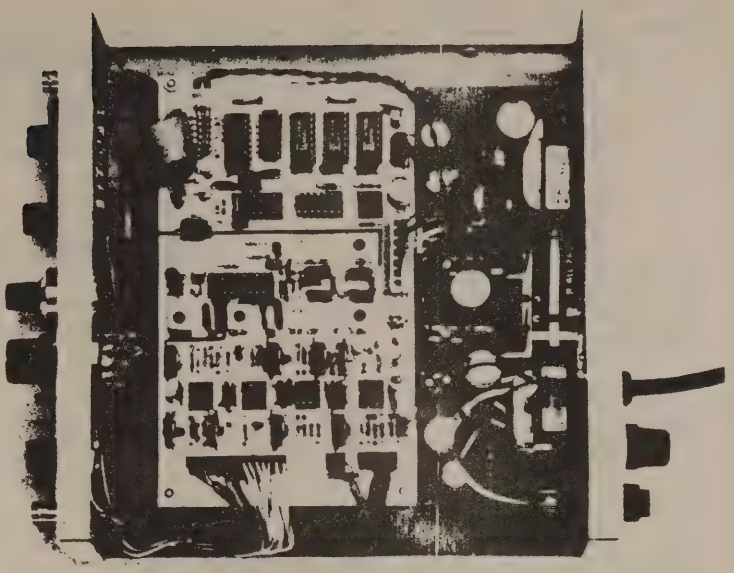
A&A ENGINEERING 450 MHZ SPECTRUM ANALYZER

It is hard to imagine having a serious electronic workbench, especially for the RF designer, without a SPECTRUM ANALYZER on it. If you have ever considered owning one and have looked in to the prices of new and even surplus equipment - you quickly learned that most units are practically unaffordable for the average hobbyists pocketbook. Some quality models can run in to the thousands of dollars. There is one known, low-priced "kit" model package on the market but it is said to have severe limitations to say the least.

A & A ENGINEERING in Anaheim, CA. has been providing low-cost kits and projects to Radio Amateurs and Electronic Hobbysists for many years. Past projects have been reviewed or talked about in past issues of our journal. Stas Andrzewski W6VCM heads up the company and can be reached at (714) 952-2114. They DO NOT have a cheap, no frills, SPECTRUM ANALYZER in their line. What they do have is a modest, fairly priced unit that is affordable to the serious experimenter with many of the desired features offered by some of the major test equipment suppliers like HEWLETT PACKARD, TEKTRONICS and others. A low-frequency OSCOPE is required by the user to be interfaced for the spectral display output.

The complete model 450-KIT SPECTRUM ANALYZER discussed below, runs $459.00. In assembled form (110VAC), it costs $799.95. A 230V 50 Hz model is also available at a slightly higher price at $809.95. If you desire, you can just order the main circuitry and display PCB part of the kit package for $39.95. The power supply PCB only runs $19.95. An RF module w/mod info & parts costs $65.00. I've listed the costs involved right up front so to let you decide right from the beginning wether or not this project is affordable for your shack workbench or not.

FEATURES INCLUDE: Logarithmic Amplitude Display, Digital Center Frequency, Display, Two Position Bandwidth (narrow & wide), 10 KHz Video Filter (switchable in/out), Variable Scan Rate (-3 to 30 Hz) and an IF Attenuator (calibrated 1 db per division). **SPECIFICATIONS:** Frequency Range; -2 MHz to >/-450 MHz. Selectivity; 15 KHz or 300 KHz, switchable. Sensitivity; -70 dbm or greater. Scan Width; OFF, 1, 5, 10, 50, 500 KHz and 1, 5, 10, 20, 50 MHz per dividion. Input Impedance; approximately 50 ohm (Modified CATV). Dynamic Range; >/-50 db. Maximum RF Input; approximately 3 dbm. Weight; 5 lbs. Size; Compact, 8 3/8 W by 8 3/8 D by 3 1/2 H (inches). The kit unit includes a prepunched, painted and silkscreened metal enclosure, a new CATV module with modification instructions, four circuit boards for main assembly, power supply, LED display and RF module conversion. All hardware and electronic components are furnished. The kit is 100% complete with nothing else to buy. The kit is definitely for the advanced builder and should not be attempted by novice constructors.



A & A ENGINEERING's SPECTRUM ANALYZER project came about as a result of an article published in the November 1985 issue of QST by Al Helfrick K2BLA. It should be noted that the article present by the League had many errors in statement in it and that corrected interpretation should be acquired from W6VCM. High performance and low cost is acheived by using a modified CATV RF converter (Jerrold 400) with digital prescaler (54-450 MHz). This is followed by a third mixer and 10.7 MHz IF where standard receiver ceramic and crystal IF filters are used. A ramp generator, with adjustable rate and selectable widths provides output to both the CATV module VCO and sweep for your low frequency scope which is required for the spectral display. A logarithmic amplifier provides a wide CRT vertical viewing range which is calibrated in db. The prescaler output is fed to a digital counter which subtracts the VCO offset and provides a three digit, center frequency LED display.

For a reprint of the QST article, write to the League directly or ESF COPY SERVICE at 4011 Clearview Drive in Cedar Falls, Iowa, USATVS MEMBERSHIP SERVICES or A & A ENGINEERING. A specification sheet and catalog of this and other products are available by writing to A & A ENGINEERING at 2521 W. LaPalma, Unit K, Anaheim, CA. 92801 (a couple 25 cent stamps is appreciated). In this column, I will from time to time, let you know of other nifty devices in addition to my regular project articles to get that electronic WORKBENCH in tip top operating shape.

A&A Engineering

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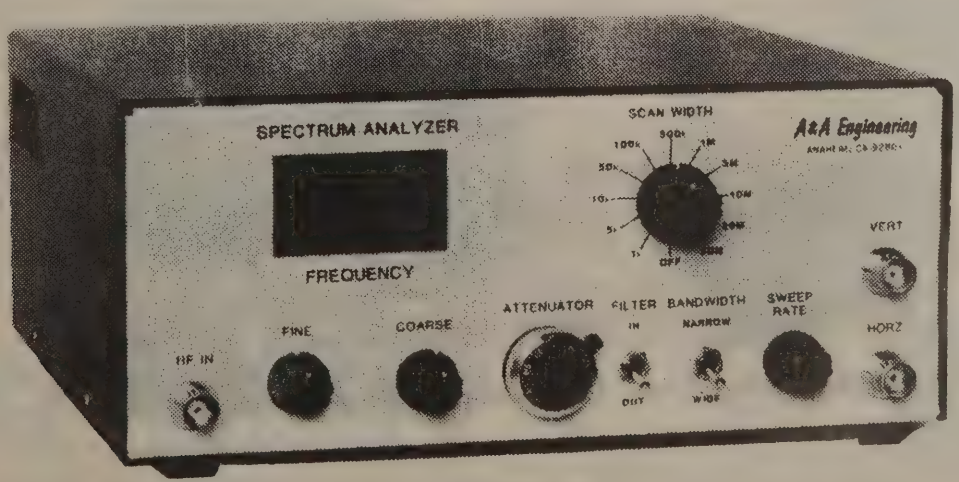

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PD-440TR-L (70 Cm.) $139.00

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PD-440N 1 to 2 watts in 18 watts out (linear) T/R $109.00
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PD-900 ½ watts in 8 to 10 watts out (FM) $50.00
Same but larger heat sink $65.00
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Same as above but larger heat sink $165.00

POWER AMPLIFIERS
1.2 Ghz.
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PD-1200TR (1 watt in 16 watts out T/R switched) $199.00
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This unit picks up your transmitted ATV signal by sampling the transmission l ine with negligible insertion loss. It uses 2 "N" connectors for input and output connections. A BNC is used on the video output. The detected output is connected to your monitor and scope so that you may accurately adjust your transmitter for proper video & sync levels. We provide two different models. Both have relative power output meters, but one has a greater accuracy. There are 2 external controls, one for video level and the other for power output on PD-VDI. This beats an on the air adjustment.

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"EARLY RADIO & TV"
with Mel Dunbrack W1BHD
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"Early TV & Radio" Night
April 26th 1991

Thanks for the kind mail received. I am growing stronger each day on a liquid diet trying to regain my strength after a lengthy illness. Mike Stone WB0QCD called again the other night to see how I was doing and once again we reminisced about the good ole' days. Bill Brown from 73 MAGAZINE was over here in Malden for a days visit to do an interview with me which I understand will appear in their January issue.

After 17 years, I turned over the operation and sponsorship of a local 2 Meter FM Repeater to a much younger gang. I enjoyed helping in that association for so many years but my health just prohibits me from getting out to do much anymore to actually help.

WB0QCD has invited me to participate in the special upcoming April DAYTON "Early TV & Radio" get-together on Friday night. If I feel stronger, I'll try to ride down with someone and help out. My son here in Malden is helping me greatly and I still enjoy doing some talking on the radio. I am glad to see SPEC-COM doing this sort of a meeting. See just some of the planned speakers in the ad shown to the right.

Starting with the next (MAR/APR '91) issue of SPEC-COM, James T. Hawes KB9EPQ of Skokie, Illinois will "take over" this "Early TV & Radio" Column. I will still send in material and might perhaps add a few comments from time to time. Although I haven't met or talked yet with Jim, I understand at a young and spry 39, he is already known as an avid and devoted Antique Radio & TV enthusiast for many years. He is a technical writer, travels and goes to a number of the Antique Wireless shows around his area and is even at this time, writing a new book with some new proposed ideas for actually experimenting with "on-air" low-resolution, narrowband TV signals based on pioneering efforts done by others back in the 20's and 30's. Please forward all your comments, letters, articles, photos, etc. to Jim Hawes directly. His address is: 8611 Kedvale Avenue, Skokie, Illinois 60076. His premiere column will appear in the next issue. Good luck Jim and "keep the historic spirit alive!"

As you all know at 81, I went through a period of history in electronics that propably will never be equalled ever again. I built, played and tested early TV and radio systems and knew many of the pioneering inventors during their time. The reason why I wanted to see a devoted column of this type presented on a regular basis in the pages of The USATVS Journal - is to be able to have a vehicle to show and tell you young'ens out there what happened before you were born and to also give space for those like me, who experienced it first hand, to write and reminisce. I am glad to see fellas like WB0QCD, K0IWX, K4NHN, AJ2X, KB9EPQ and others wanting to carry on the torch of our earlier experiments that made Radio and Television what is is today. K0IWX's MECHANICS OF TELEVISION thick book is highly recommended.

There is a rather large group of us historic electronic enthusiasts around the country and many have actual museums of collected equipment. Ken McIntosh up in the Balitimore area use to publish quite a periodical on the subject a few years ago. I have heard of a Brewster chap over in the Pittsburgh area, Bill Parker down in Florida, Bill Allen in Bettendorf, Iowa, Ed Taylor in Indianapolis keeping the spirit alive. There are many, many others. There are a number of clubs also in the country. I understand the ANTIQUE RADIO CLUB of OHIO will be assisting with the scheduled Friday night ATV WORKSHOP session. ANTIQUE RADIO CLASSIFIED in Carlisle, MA. already has a nice monthly magazine devoted to the trade. The HAM and NON-HAM community needs a national NEWSLETTER or publication devoted to these people, their inventors and experiments. SPEC-COM could be that vehicle. I'd like to see the pages of SPEC-COM expanded greatly or perhaps a 2nd publication distributed.

We'll that's about it for this issue. I'll still be around (God willing). If you want to make me really happy, help the SPEC-COM boys out and make this column grown into something of national importance. Our heritage is an important rememberance not to be overlooked lightly. 73's to my fellow Hams and builders de Mel W1BHD-TV.

PLAN TO ATTEND
6th Annual
USATVS ATV WORKSHOP SESSION #1
"Early TV & Radio" Night
April 26th 1991

RAMADA INN NORTH
(I-70/I-75) Little York Road Exit
Dayton, Ohio HAMVENTION Weekend
Ramada Room Reservations: (513) 890-9500

Scheduled Speakers:

Peter Yanczer K0IWX - TELSA Publications - Peter Yanczer, author of THE MECHANICS OF TELEVISION book (see Ad) is very well known and respected around the country for putting on one of the best "Early Mechanical TV" talks and actual demonstrations! He will bringing with him from the St. Louis area, actual 1920-1930 era TV transmit equipment including Scanning Disk and Mirror Image Projection Systems. He will even be bringing one of the "original" FELIX the CAT dolls used by early commercial TV broadcasters!

James Hawes KB9EPQ - Skokie, Illinois - Jim Hawes, our new "Early TV & Radio" columnist, is an avid collector and student of Antique Radio & TV equipment and operating practices. As a technical writer, Jim has attained a wealth of knowledge about the subject and is even writing a new book about it. Meet him in person Friday night!

Gerald Cromer K4NHN Cayce, South Carolina - Gerald is a well known operator, designer & builder within the Ham Radio ATV community. A few years ago, he took serious interest in Antique Radio & TV collecting and he will be bringing us some of his prized pieces for "show'n'tell".

Jerrold Hueber - Radio Collectors of Ohio Club - Jerrold and members of a new local Dayton Antique Radio Club will be co-hosting the Friday get-together bring lots of refurbished old-time equipment for show and display. A few speakers will also address a number of related subjects during the evening.

Andrew Alford - Alford Antenna Company - We are trying to get confirmation for the attendance of historic inventor Mr. Andrew Alford to attend our session. If he can make it, an hour long talk will certainly go by fast as he discusses his 1939 antenna inventions that we are still making use of even today.

Ken McIntosh - Baltimore, MD. - Ken's collection of Early TV equipment is perhaps THE BEST in the country! The New York BROADWAY Museum and The SMITHSONIAN INSTUTUTE in Washington, D.C. thought so, acquired his collection of 29 pieces, displayed them in a special display "50 YEARS OF TV" until late November before returning them all unharmed. Ken's VHS VIDEOTAPE program entitled "ORIGIN OF TELEVISION" which shows Ken's exhaustive research and study on the subject as well as his personal collections will be presented in its entirety Friday night! A limited number of authorized copies of this tape will also be available.

MORE SPEAKERS ARE CURRENTLY BEING LINED UP!

Sponsored by SPEC-COM Communications & Publishing Group Ltd and The UNITED STATES ATV SOCIETY. More specific details will be presented in our next issue.

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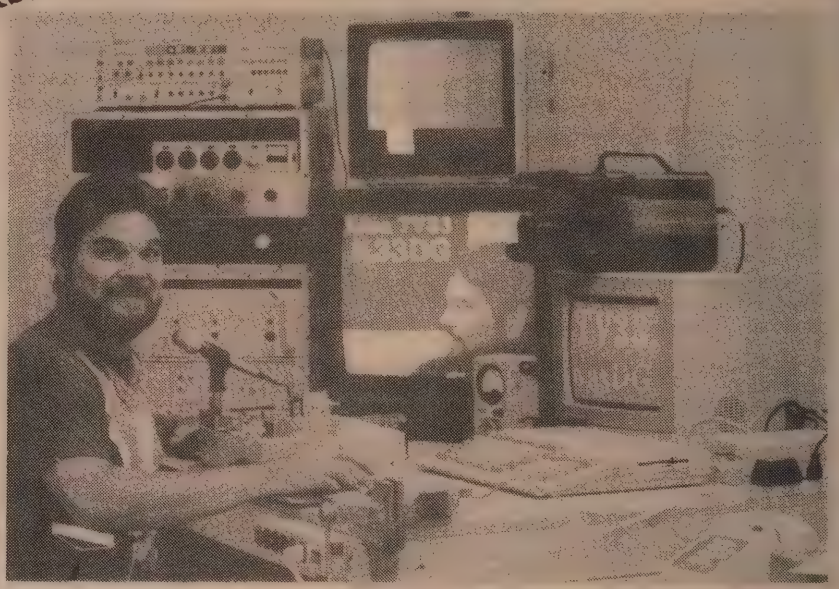

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President/General Manager
TootleVision Broadcasting/Tulsa TV33

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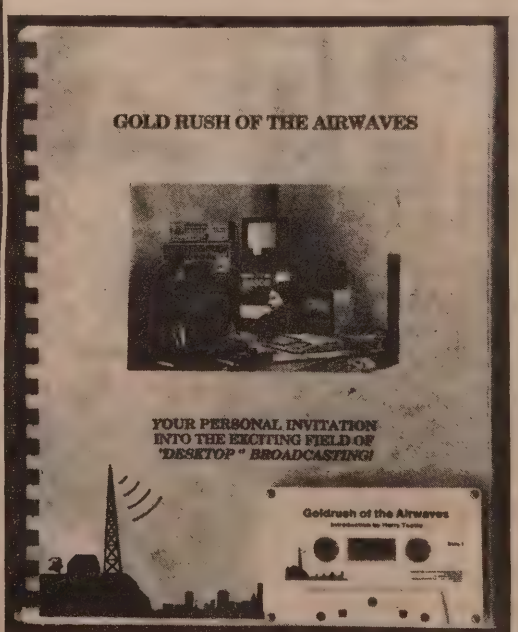
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"Harry Tootle's LPTV Column will return next issue written by Mike Veldman WD0CTA. Mike is designing and building LPTV systems for TOOTLEVISION. He will also cover broadcast TV techniques, Microwave and TVRO subjects." -WB0QCD

ChannelPlus®
MESSAGE GENERATORS

ADD TEXT TO ANY VIDEO

A ChannelPlus Genlock Message Generator adds time, date and moving text messages to ANY video picture. Perfect for inserting targeted advertising or other messages over video originating from any source. It is installed in minutes and is easy to use; ideal for restaurants, bars, hotels, motels, hospitals, apartment houses, cable television systems, schools, offices, airports, etc.

OVERLAY ANY VIDEO SOURCE

The ChannelPlus Genlock Message Generators are different from the usual graphics generators because the time, date and text messages OVERLAY the video images originating from satellite receivers, cameras, channel processors, etc. As a result, genlock messages will be seen because they overlay channels that are being watched by the viewer. With the ChannelPlus Genlock Message Generator the viewer is not required to tune to a special "house" channel to get the advertising or other information.

Example: GLM output on TV
Date/Time/Crawl ON/OFF & Intermittant Selectable

EASY TO USE

The ChannelPlus Genlock Message Generators have been designed to be easily used by hotel clerks, bartenders, nurses, receptionists, etc. The text message is entered as though it was being typed on an ordinary typewriter.

GENLOCK MULTIPLIER OPTION

The ChannelPlus Genswitch™ Video Sequencer model GEN-SWI allows any model Genlock Message Generator to be shared by up to eight video sources. The user enters the message into the message generator and sets the timer indicating how many video sources are to view the message. When the timer starts the message, it appears overlaying the first video source. The message is then sequentially overlayed on each of the other sources. The result is that as many as eight different video sources may be automatically overlayed with only one message generator.

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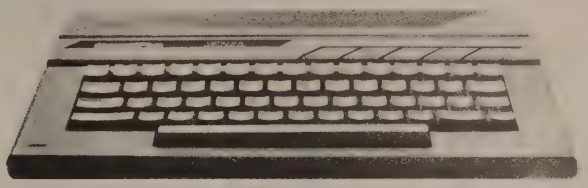


Model GLM-1+

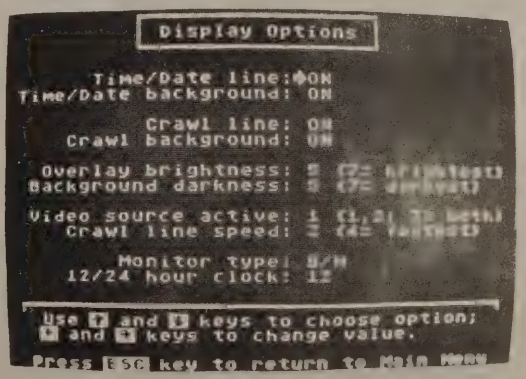
Model GLM-1 Video Message Generator System
(Dedicated AMIGA Computer Is Included)
Factory List $950.00
Our Price $795.00

MODEL GLM-1

The basic model GLM-1 displays time, date and moving text. Up to 740 characters can be stored in the moving text memory displaying 20 characters on the screen at any one time. The "crawl" speed of the text line is controlled by keyboard command. All text and command memory is protected against loss due to power failures. The GLM-1 has four font sets including a number of graphics characters.

MODEL GLM-1+

The model GLM-1+ has all of the features of the GLM-1 plus a "scratch pad" memory of 720 characters. This allows two different crawl line messages to be stored - either may be displayed at the stroke of a key. Having two independent crawl line memories is useful in many applications. In a bar, restaurant, lounge, disco, for example, the main memory can be programmed with the evening's specials; the scratch pad memory can be used to make announcements; the crawl line can be changed from one to the other and back again in a few seconds. NTSC Output Port to Feed ATV Transmitter.


Display Options
Time/Date line: ON
Time/Date background: ON
Crawl line: ON
Crawl background: ON
Monitor type: B/W
12/24 hour clock: 12
Use ↑ and ↓ keys to choose option;
← and → keys to change value.
Press ESC key to return to Main Menu

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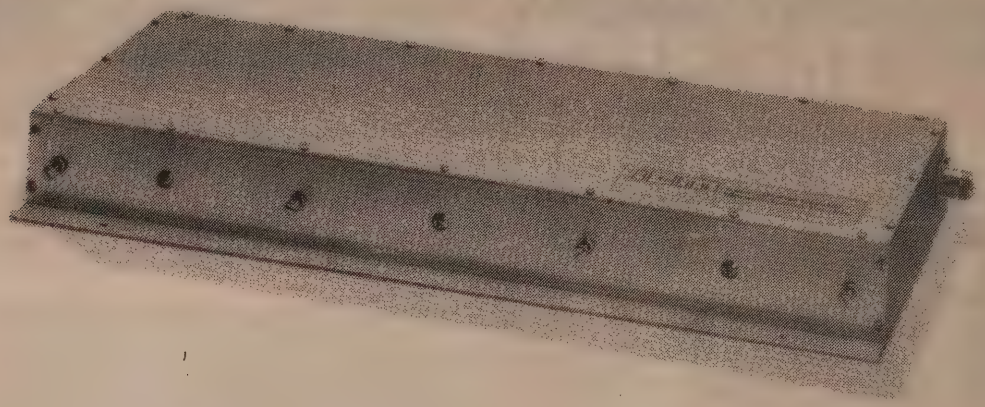
NEW ICM FL407 INTERDIGITAL AMATEUR TELEVISION FILTER RELEASED!

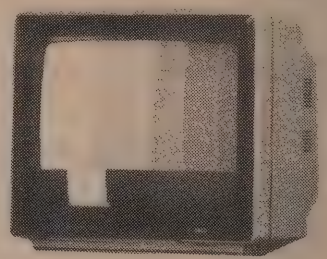


INTERNATIONAL CRYSTAL MFG. ENTERS HAM-TV MARKET

by Mike Donovan KA0JAW

SPEC-COM was the first HAM and ATV publication (two issues ago - SEP/OCT '90) to bring you word about a new line of ATV Interdigital bandpass filters from Microwave Filter Company in Syracuse, New York. More information and actual test results are forthcoming on their released products in our next issue. Now we bring you the reader, yet another new product announcement!

INTERNATIONAL CRYSTAL MANUFACTURING Company loacted in Oklahoma City, OK is known worldwide for their crystal manufacturing and distribution reputation. They are expanding into other lines that are of great interest to the Ham Radio hobbyist and in particular to those Hams who send "live" Fast Scan TV pictures! Mr. Royden Freeland, President of ICM is our contact there. He has been most helpful to us providing our publication with the latest new product information. Here in Iowa, we received one of ICM's newest model transmit filters to check out on our Maquoketa, Iowa ATV Repeater system at 427.250 MHz. WB0QCD will soon be installing it and of course we will report back to you with the results. I'd like to personally thank Royden and ICM for taking out a years worth of two separate half-page ADS in the new WHITE PAGE center section AD insert!



The first released filter out from ICM is the 7-pole Model ICM FL407. It is very attractive looking and is designed/tuned for the 70 cm band area on UHF. The FL407 unit is much bigger than we are accustomed to seeing bandpass filters and ICM's unit is made out of lightweight, all-aluminum, well machined material. Type'N connectors are used mounted to the ends of the chassis. ICM is planning on having a 1.2 GHz filter in about 60 days and is considering making up smaller RECEIVE filters for 420-440 MHz as well. If you are planning on ordering out some of their products, ICM recommends ordering both RECEIVE and TRANSMIT filters at the same time. For a limited time, ICM is throwing in the required T connection and two output phasing cables for any two order products at no additional charge!

All filters are tuned using a sweep system for the best bandpass and lowest return loss. ICM quite correctly points out that tuning these types of filters is quite critical and should be done only by qualified personnel with good test equipment. These filters have been tested at 400 watts at the factory - however ICM recommends 200 watts as the maximum allowable power input level. When ordering, please specify the video carrier frequency that your group will be operating on. Each filter is factory tuned with the video carrier 1.25 MHz above the lower 6 db point on the filter.

SPECIFICS: Nominal loss 1.5 db. Design Impedance input and output 50 ohms. Rejection +/- 5 MHz from center: 47 db. Rejection +/- 10 MHz from center: 90 db. Frequency tuning range: 420-440 MHz. Nominal Bandwidth: 6 MHz. Band pass ripple: .5 db. Dimensions HWD: 2 1/8" X 8 13/16" X 20 5/8" Overall.

We will have more information for you in future issues on these and other ICM products. Order Model Number FL407 Interdigital Filter, Catalog No. 035026. Price: $249.00. International Crystal Manufacturing Company, P.O. Box 26330, 701 W. Sheridan, Oklahoma City, OK 73126-0330. TOLL FREE: Voice 1-800-426-9825, FAX 1-800-322-9426. Send an SASE for a FREE, color brochure on the unit. Be sure and mention that you saw this product announcement in SPEC-COM. Thanks & 73's de KA0JAW

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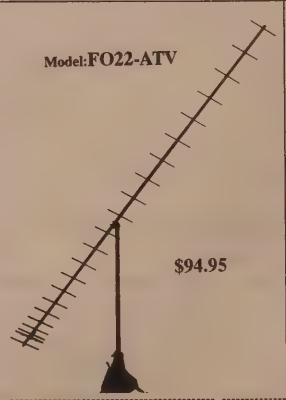
MEASURED GAIN >14.8 dBd FROM 420 TO 450 MHz



ELECTRICAL SPECIFICATIONS:
Gain peak ..... 15.8 dBd (436 MHz)
VSWR .... < 1.33:1 415 to 450 MHz
E-Plane beamwidth ..... 23 Deg.
H-Plane beamwidth ..... 24 Deg.
Sidelobe attenuation
1st E-Plane ..... -17.5 dB
1st H-Plane ..... -15.5 dB
Maximum power ..... 1500 Watts
F/B ratio ..... 22 dB
Impedance ..... 50 ohm

MECHANICALSPECIFICATIONS:
Length ..... 14 Ft.
Boom ..... 1" OD 6061 T-6 Al
Elements ..... 3/16" Al rod
Mast ..... up to 1.5" dia.
Wind surface area ..... .78 Sq.Ft.
Wind survival ..... 90+ MPH
All Stainless Steel Element Hardware
Coax connector ..... N-type
Polarization: Horizontal or Vertical

ALSO AVAILABLE
RA4-50, RA7-50, RA8-2UWB, FO12-144, FO15-144, FO16-220, FO22-432, FO22-ATV, FO25,432, FO33-432, FO22-440
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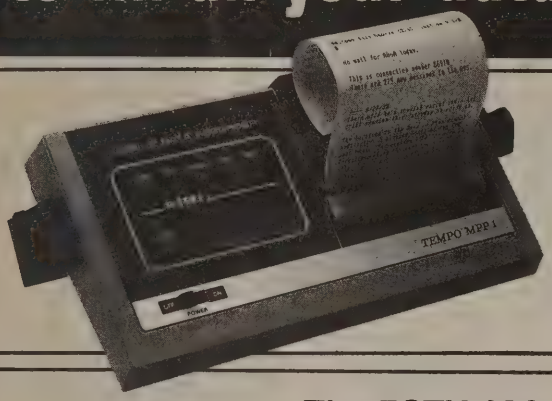
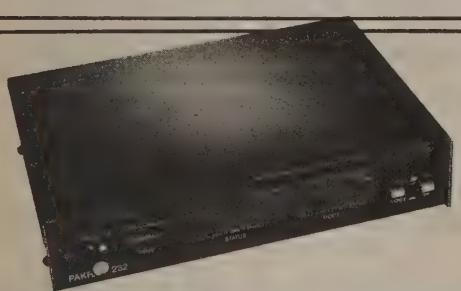


The TEMPO MPP1 TNC/printer. . .$249

A unique new mobile data printer. It incorporates a packet controller with a 40 column thermal printer that operates on 13.6 VDC and interfaces with any mobile radio. In a recent user test it proved to have about twice as much audio level range tolerance as other TNCs. It is also an ideal unit for emergency work and a commercial version is perfect for dispatching service, emergency and police vehicles.

The FSTV-430A, AEA's newest

The exciting FSTV-430 fast scan television transceiver makes getting on ATV easy and inexpensive. . .live or taped. Almost any video camera can be used. Simply plug it into the FSTV-430, connect to your 70 cm antenna and you're on the air. Use a standard TV for receiving signals and, of course, an amplifier will extend your range. It's reliable, portable and light weight and can be used in-station or mobile from any 12 VDC source. The only license required is a technician or higher.



The PK232/MBX by AEA

. . .the only controller offering Morse Code, Baudot, ASCII, AMTOR, Packet, and facsimile Transmission & Reception plus the ability to monitor the new Navtex marine weather and navigational system. . .7 modes in one controller. The PK-232 makes any RS-232 compatible computer or terminal the complete amateur digital operating position. All decoding, signal processing and protocol software is on ROM. Only a simple terminal program (like those used with telephone modems) is required to interface the PK-232 with your computer.

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"DIGITAL FRAMESTORE"

FACSIMILE and SLOW-SCAN TV Column Written by Fred Sharp W8ASF

4676 Hamlets Grove Drive, Sarasota, FL. 34235 [Also Available at ECBBS]

Well, I hope everyone enjoyed the new look last issue of Spec-Com with the color covers. Also note that Spec-Com has some heft to it now with more interesting pages. I'm finding it a distinct pleasure to be associated with it, but now on to the news.

John Beanland G3BVU of SPECTRUM INTERNATIONAL has acquired U.S. distributorship on the TIMESTET complete WEFAX system. Complete means receiver, downconverter, preamp, all cables, loop yagis etc. It works with IBM type computers, has software and interfaces all for around $1,100. Not bad for a very professional entire system with nothing else to buy. See John's ads in this issue for more details. He will have it on display at Dayton and at the Saturday Night USATVS WORKSHOP session.

Greg Mengell KA6DPV of Rancho Cordova, CA is alive and well and back writing again! He is, as you remember, the former Editor of that great WEFAX dedicated newsletter J.E.S.A.U.G. that somehow fell apart much to the disappointment of many readers. Mike Stone WB0QCD advises me that Greg has been hired to do a series of 6-8 page technical articles & columns beginning with the March/April 1991 issue of SPECCOM and that all former JESAUG newsletter subscribers will be sent postcards and sample issues. He will also be at Dayton speaking on the WEFAX portion of the Saturday night program at the RAMADA. Welcome back Greg!

I would guess that there are somewhere between 1500 and 2500 YU3UMV weather satellite scan converters in use in the world today and I have had a number of requests to furnish information on how one might easily modify the YU3UMV to receive Weather Charts and some FAX on it. The RIG group of England had an article recently published for the many YU3 users a modification, made by John Townsend, G4ILY. With blessings from RIG, I repeat the essence of the article, with illustrations.

YU3UMV SCAN CONVERTER MOD FOR VHF WEFAX RECEPTION

A converter to process FSK on 134.2 KHZ with a shift of about 360 HZ and allow the resulting pictures to be viewed on the YU3UMV framestore instead of a FAX machine for which they were intended was described by a German author in VHF Communications, Summer of 1982, operating by demodulating the FM audio, filtering and the resulting audio being used to amplitude modulate a 2.4 KHZ oscillator. A simpler approach would be to use the demodulated AM signal produced by the input rectifier circuits of the original design.

CIRCUIT DETAILS

The signal from the SSB receiver is filtered by a low Q bandpass circuit constructed with a 741 op amp. The filter is centered on 2.4 KHz with a 3 db pass band between 1 KHZ and 5 KHZ, the purpose of which is to remove noise components above and below the desired signal frequency without affecting the spectrum of the frequency modulated audio carrier. A second stage of amplification follows using a 709 op amp. This op amp is operated as a limiter and it is necessary to maximize it's slew rate in order to obtain the best possible output square wave shape. Do not substitute a 741 here. The signal from the limiter is used as the input to a phase locked loop ic type NE 565. The differential output from the PLL chip on pins 6 and 7 is amplified by another 741 op amp. This amplifier stage has a high frequency roll-off above 1.5 KHZ to reduce the demodulator ripple. The main LF video filter in the frame store removes the rest of the ripple.

The components on pins 8 and 9 of the PLL are chosen to give a free running oscillator frequency of approximately 1.8 KHZ. This allows the black and white levels of the LF video output to be at 0.25 volts and 1.5 volts respectively, which matches the coppesponding levels in the existing AM detector in the frame store. The overall output signal is taken from a potentiometer which allows it's range to be set to match the frame store input requirements. The circuit was designed to operate from +12 and -12 volt power already available on the YU3UMV board.

CONNECTION TO THE FRAMESTORE

In the YU3UMV design, I101 performs the functions of rectifier and filter. The filter section dealing with the demodulated LF video signal has pin 14 as it's output point. The circuit in this area of the PC board is shown in FIG 1a and the modified form in FIG 1b. You will see that the output filter circuit can now be used for either the original AM signal or the new FM derived signal by switch selection.

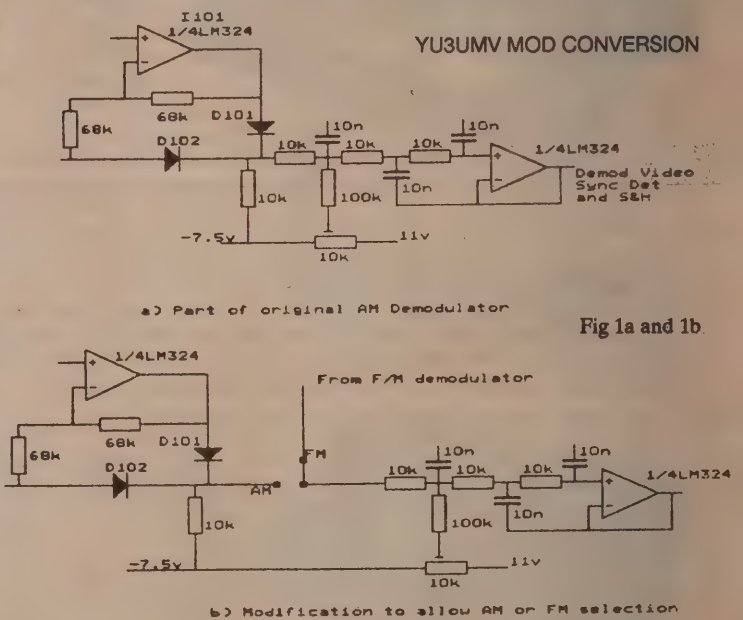

Fig 1a and 1b

SETTING UP

You will need an audio frequency generator of some sort. The author used the SSB rig itself and used the frequency calibration marker oscillator to generate the 1.8 KHZ tone. A scope is also useful in checking. With no signal applied to the input, check to see that the output level of the input filter amplifier is within a few tens of millivolts of 0 v. Do the same for the 709 limiter amplifier. Apply input signal and check if the signal at the output of the filter is not reaching the amplifier output limits and is reasonably sinusoidal. If not, reduce the input signal. Now check the limiter to see that it's output is approximately a square wave and running to within a couple volts of each supply rail. The 1K pot on pin 8 of the 565 is adjusted so that the output level from the second 741 is at 0 volts. Output should swing smoothly through zero as the pot is adjusted. Connect up the framestore. Tune in a FAX signal on your SSB receiver and the correct audio should sound like a musical scraping sound. At1 this point you should be receiving a picture. If black and white are reversed, use the opposite sideband.

BACK TO FAX NEWS...

Just a bit of polar satellite news. It seems that the Soviet Meteor 2-17 has been turned off again and Meteor 2-18 has taken it's place. Meteor 3-2 and Meteor 3-3 as well as Meteor 2-16 are active now. This is the most Meteors being active at the same time that I can ever remember. Soviets turn them on and off all the time, as well as change frequencies. The 20 LPM Meteors haven't been heard much lately and it's all for the best, as my 20 LPM mod for the YU3UMV doesn't work. I've written to the RIG group in England who published the mod but never had an answer. The frequency used by the Chinese Fen Yun 1B, 137.795 MHZ is being used by another satellite with a very weak signal. News on this when I find out something.

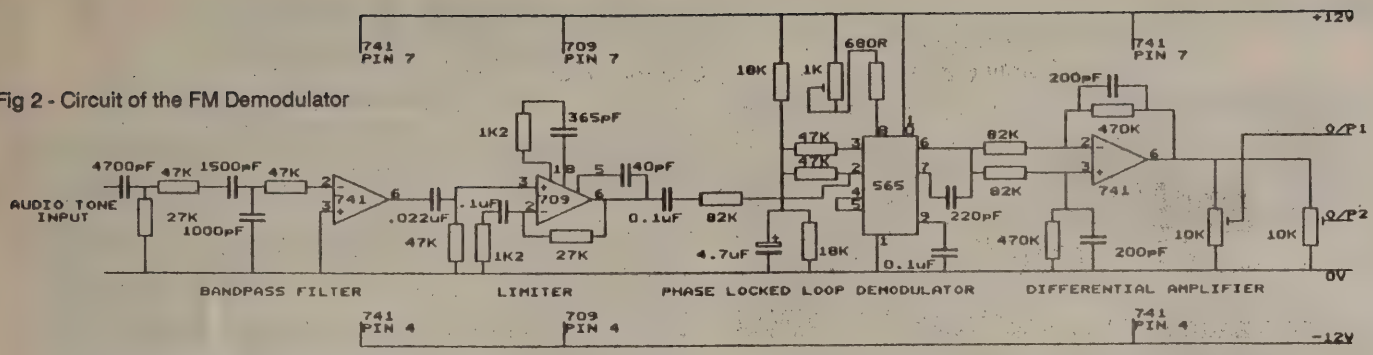

Fig 2 - Circuit of the FM Demodulator

STEVE PADAR SUPER-SHACK/WEFAX DISCS

On the subject of satellites, my friend Steve Padar here in Sarasota has finally taken a couple pictures of his new Satellite receiving room and of his wonderful "antenna farm". The pictures are shown here. Look at em and weep! Steve recently got a video disc player with an RS 232 output so that he can interface it to his computer and show the large number of stupendous Landsat pictures available. I visited with him a few nights ago and saw a video disc that contains images with recognizable land and city features of the entire United States. These pictures are selected by a printed grid of the USA. Just select the proper longitude/latitude numbers and display not only Sarasota Florida, but Siesta Key in Sarasota, and not only Siesta Key but the connecting bridges on Siesta Key. The resolution is amazing and there is even a zoom function available. Do this also with Mentor-on-the-Lake, Ohio and Disneyland!

SLOW-SCAN TV NEWS...

In SSTV, the Martin Emmerson English Eprom for the Robot 1200C and the LM9000 scan converters is now a reality and is being field tested. It is the version 4.0 with the AVA 90 and 94 speeds. It will be selling for, don't quote me, over $100 and even the upgrade (if you already own the older version will be $90) As for myself, I really have to weigh the advantage of this Eprom, inasmuch as there are only a "select" very few SSTV'ers using these modes, and certainly close to zero users in the rest of the world. It's still a fact, that most of the slow-scan in the world today, taking the average, still uses 8.5 second, 128 x 128 black and white. Certainly there is some color SSTV and other speeds, worldwide, but I'm talking about a world average. Something new has also been added to the new Eprom. I'm told that there is a tiny display of your call letters in the upper corner of every picture sent. I assume this is to discourage bootleggers. Tom Hibben KB9MC furnished all the data on the AVT 90/94 second modes to Emmerson without, I understand, a very hearty handshake for the effort. People like Tom, who really "bend over backwards" to help people in SSTV sometimes suffer from not being appreciated enough or at all. Maybe some day Tom will say, "No more nice guy". I could hardly blame him.

Japanese JF3GOH HI-RES Color SSTV Scan Converter

A little more news about the JF3GOH high resolution SSTV board set. Don Lucarell K8SQL has built one up and in a side by side comparison with the Robot 1200C, Don says the Japanese system is far superior in color gradations and resolution. If interested, I suggest you get hold of Don. He's OK in the callbook. On the subject of Japan, the results of the Japanese #13 SSTV contest are in and JA6OAC came in with the winning number of points (37,320). My friend Katsu Kambara JG1DDT of Japanese CQ Magazine came in 28th with 425 points. The joint sponsored USATVS/CQ-JA "Hands Across the Sea" SSTV contest that started back in July is just now wrapping (DEC 31st). I hope to have some of those results perhaps in the next issue.

I reported last month that Bert W5ZR was out with his new SCAN graphics program for the IBM PC and the 1200C. Inadvertantly, his SCAN was referred to as an EPROM. It is not. It is software, and excellent. The IMAGE graphics board has just come out, manufactured by Dick Isely WD9GIG. Originally designed to be a de-bugged, upgraded KC5VC SSTV.COM, it progressed on to a completely new design in a machine code program compiled from Turbo Pascal 5.5. Just to paraphrase some of the features, It works on any IBM or Clone PC, XT or AT with 8086,8088,80286 or 80386 micro. I am told it can run at 25 MHZ! It uses any of the parallel I/O boards on the market. Runs with a mouse and can load and display .PCX,.PIX,.IMG and PC Paint graphics. The program has a number of graphic text fonts, which can be sized or colored in many variations. Write George R. Isely at 736 Fellows St, St. Charles, IL 60174 for more details.

Belated Holiday Greetings to you all. Fred Sharp W8ASF

Fred Sharp W8ASF may be reached on the ECBBS (319) 582-3235.

NEW 1691 MHz Weather Satellite System from TIME-STEP and S.I.!

Spectrum International, Inc. is pleased to announce their appointment as North American and International Distributor of Time-Step Electronic's Weather Satellite Receiving System.

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ASTRON POWER SUPPLIES

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SPECIAL FEATURES

- SOLID STATE ELECTRONICALLY REGULATED
- FOLD-BACK CURRENT LIMITING Protects Power Supply from excessive current & continuous shorted output
- CROWBAR OVER VOLTAGE PROTECTION on all Models except RS-3A, RS-4A, RS-5A, RS-4L, RS-5L
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PERFORMANCE SPECIFICATIONS

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Irvine, CA 92718
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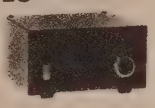
SL SERIES

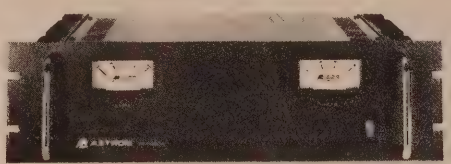
MODEL	Colors Gray	Colors Black	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
• LOW PROFILE POWER SUPPLY						
SL-11A	•	•	7	11	2¾ x 7⅝ x 9¾	11

RS-L SERIES



MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
• POWER SUPPLIES WITH BUILT IN CIGARETTE LIGHTER RECEPTACLE				
RS-4L	3	4	3½ x 6⅛ x 7¼	6
RS-5L	4	5	3½ x 6⅛ x 7¼	7

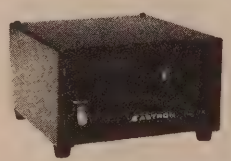
RM SERIES



MODEL RM-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
• 19" RACK MOUNT POWER SUPPLIES				
RM-12A	9	12	5¼ × 19 × 8¼	16
RM-35A	25	35	5¼ × 19 × 12½	38
RM-50A	37	50	5¼ × 19 × 12½	50
RM-60A	50	55	7 × 19 × 12½	60
• Separate Volt and Amp Meters				
RM-12M	9	12	5¼ × 19 × 8¼	16
RM-35M	25	35	5¼ × 19 × 12½	38
RM-50M	37	50	5¼ × 19 × 12½	50
RM-60M	50	55	7 × 19 × 12½	60

RS-A SERIES



MODEL RS-7A

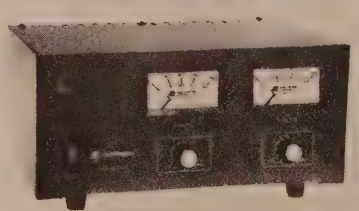
MODEL	Colors Gray	Colors Black	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
RS-3A		•	2.5	3	3 × 4¾ × 5¾	4
RS-4A	•	•	3	4	3¾ × 6½ × 9	5
RS-5A		•	4	5	3½ × 6⅛ × 7¼	7
RS-7A	•	•	5	7	3¾ × 6½ × 9	9
RS-7B	•	•	5	7	4 × 7½ × 10¾	10
RS-10A	•	•	7.5	10	4 × 7½ × 10¾	11
RS-12A	•	•	9	12	4½ × 8 × 9	13
RS-12B		•	9	12	4 × 7½ × 10¾	13
RS-20A	•	•	16	20	5 × 9 × 10½	18
RS-35A	•	•	25	35	5 × 11 × 11	27
RS-50A	•		37	50	6 × 13¾ × 11	46

RS-M SERIES

MODEL RS-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
• Switchable volt and Amp meter				
RS-12M	9	12	4½ × 8 × 9	13
• Separate volt and Amp meters				
RS-20M	16	20	5 × 9 × 10½	18
RS-35M	25	35	5 × 11 × 11	27
RS-50M	37	50	6 × 13¾ × 11	46

VS-M AND VRM-M SERIES

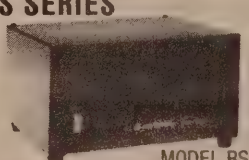


MODEL VS-35M

• Separate Volt and Amp Meters • Output Voltage adjustable from 2-15 volts • Current limit adjustable from 1.5 amps to Full Load

MODEL	Continuous Duty (Amps) @13.8VDC	@10VDC	@5VDC	ICS* (Amps) @13.8V	Size (IN) H × W × D	Shipping Wt. (lbs.)
VS-12M	9	5	2	12	4½ × 8 × 9	13
VS-20M	16	9	4	20	5 × 9 × 10½	20
VS-35M	25	15	7	35	5 × 11 × 11	29
VS-50M	37	22	10	50	6 × 13¾ × 11	46
• Variable rack mount power supplies						
VRM-35M	25	15	7	35	5¼ × 19 × 12½	38
VRM-50M	37	22	10	50	5¼ × 19 × 12½	50

RS-S SERIES



MODEL RS-12S

• Built in speaker

MODEL	Colors Gray	Colors Black	Continuous Duty (Amps)	ICS* Amps	Size (IN) H × W × D	Shipping Wt. (lbs.)
RS-7S	•	•	5	7	4 × 7½ × 10¾	10
RS-10S	•	•	7.5	10	4 × 7½ × 10¾	12
RS-12S	•	•	9	12	4½ × 8 × 9	13
RS-20S	•	•	16	20	5 × 9 × 10½	18

*ICS—Intermittent Communication Service (50% Duty Cycle 5min. on 5 min. off)

HOW TO RECEIVE APT PICTURES FROM THE NOAA SATELLITES

by DR. Jeff Wallach N5ITU - Dallas Texas

So you have decided you want to receive the NOAA and Russian METEOR orbiters and you have a radio that receives 137.500 MHz and a computer. So now what do you do? I hope this short dissertation will steer you in the correct direction.

To display a picture from the orbiting birds you need several things. First you need to 'acquire' the satellite. This means you need the program to calculate its position at any time and determine if you can hear the signals from the 'bird'. The best place to get this program is probably AMSAT-NA an organization dedicated to AMateur SATellites. They have several very good tracking programs for the IBM and also for Commodore and Apple as well. After you have acquired the program and have it running on your computer, you then need the Keplerian Elements for the NOAA satellites. These elements as well as some tracking programs are available from the CELESTIAL RCP/M, run by TS Kelso, at 513-427-0674 (Fairborn,OH) and from the Weather Fax and Remote Imaging DATALINK BBS run by Dr. Jeff Wallach, N5ITU as bulletins for some 80 + sets of satellite data. Another bulletin also tells you to what the printed numbers correspond so you can enter them into the computer program. Use the newest elements you can find as the orbiting satellites are subject to forces which change their orbits. If you use Keplerian Elements more than 3 or 4 weeks old, your chances of hearing the bird are reduced. Once you are tracking the birds you should hear them on your receiver. They will be on 137.62 (NOAA-11), 137.500 (NOAA-10), 137.850 (Meteor 3-2), 137.4 (Meteor 2-16), 137.3 (Meteor 2-17 and 2-18).

Now comes the first thing different about NOAA orbiters. The frequency deviation of the FM transmission is about +/-18-20 kHz. This is 4 times the normal deviation of a police call and 1/3 the deviation of the FM broadcast band FM signal. If you receive the signal on the regular communications width of the scanner the light areas of the picture will be noisy and the signal will sound distorted and the picture will basically be useless. If you use the FM broadcast bandwidth (assuming your scanner will let you), the signal will be weak and there may be too much background noise to see the picture.

So what now ? Well there are two ways to fix the problem, find a receiver with the proper I.F. bandwidth filter of 50 kHz, or modify the I.F. of your scanner to about 50-80 kHz. The simplest mod which has been found to be workable is to remove the narrow communications I.F. filter and replace it with a 0.01 uFd capacitor. This provides for good Wefax pictures from GOES and pretty fair NOAA orbiter pictures. It can of course result in retuning the radio, voiding the warranty and making the squelch not work properly.

The other characteristic of the NOAA satellite transmissions is THEY ARE WEAK. To get good pictures over a large area we have found a pre-amplifier to be essential. A GaAs-FET type can be obtained from various sources at a reasonable price but still about 50-100 dollars. You can also build one for about 25 dollars from plans for a pre-amp for the 2-meter amateur band and tune it to 137.5 easily.

Lastly, but importantly, the antenna can be of an omni directional, uniform pattern type such as a turnstile antenna similar to those used in the FM broadcast reception business but of course tuned to 137.5 MHz. Mount the pre-amp at the antenna if possible. Crooked coathangers on broomsticks have been known to work, and it is not difficult to build the antenna. Of course 2-meter beams with Az/El tracking will do the job well.

Now that you have a nice audio signal from the satellite, what happens next? The audio tone of 2400 HZ which is the carrier tone that is used to carry the picture information (video), must be detected and the video data converted from analog to digital and then displayed on the computer monitor by the software. The hardware and software to do this is available from several sources with more coming along. Several stand-alone boxes are also available that produce some form of computer output either in printed form or on the display. In addition the people on the DATALINK BBS may also have some data to share with you regarding this equipment.

The USATVS sponsored EC BBS in Dubuque, Iowa (319) 582-3235 is beefing up a special FAX Menu section with articles, information and some store image pictures.

At the present the simplest software for the IBM is the David Schweittek MULTIFAX software and PRECISION interface. Mike Donovan KA0JAW reviewed this software and hardware in our last SPEC-COM issue. A hardware kit for MULTIFAX is also available from A&A Engineering which includes the video dectector circuit and A/D converter.

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Records, views and PRINTS in 2, 4, 8 or 16 colors or shades from a group of 64. Gray-scale viewing with G-S monitor.

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Same as EGA but from a group of 262,144. Gray-scale viewing.

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PRICE: $49.00 for any program ($20.00 for previous MF buyers), post paid in USA, Canada & Mexico. Add $3.00 for airmail elsewhere. No credit cards.

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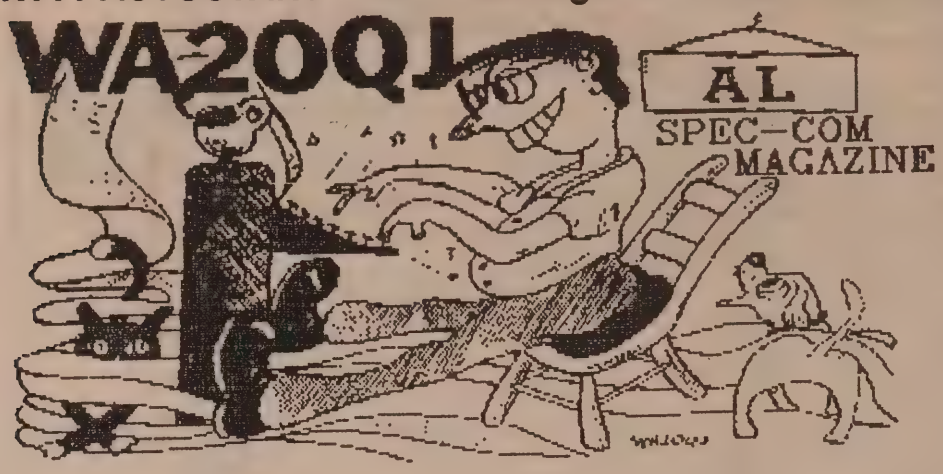
"RTTY AUTOSTART" with Al LaVorgna WA2OQJ



The RTTY Journal

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RTTY RHETORIC - PK-232 & LANGUAGES

"... it is just the inability or embarrassment of not being able to talk fluently in our language."

Here we are into the winter months again and the bands seem to be exploding with RTTY signals. I wonder if it is band conditions or the fact that old man winter keeps us in that nice warm shack, heated by those glowing 6146's?

First, a product news announcement from A.E.A.. Their PK-232 Data Controller is perhaps the most popular all-mode unit in the Amateur marketplace. An upgrade board circuit and EPROM called the MBX is available which includes a new updated, automatic PERSONAL MAILDROP (Packet). Those using IBM or compatible computers are using AEA's PC PAKRATT disk software program that ease's you in and out of all the available modes as well as for setting parameters. With the latest MAILBOX upgrade (reviewed in past issues of SPEC-COM) many of the new commands must be entered from DUMB TERMINAL mode since the mailbox mod changes came long after the PC PAKRATT program was released. AEA has now released a new version of PC PAKRATT called PC PAKRATT 2. They began shipping copies in mid-December. WB0QCD has a copy coming and will be reviewing it in perhaps the next issue. It has been reported that a serious COPYRIGHT duplication problem exists within the Ham Radio community on the first release version of this program. I find it surprising that many of you can afford to spend a coule hundred dollars on a TNC but not $29.95 on controlling software, much less that you are giving away copies which is illegal pirating. Come on guys - as the message says on PC PAKRATT's opening screen, you are taking the food (and incentive for new products) right out the mouth of those who have obviously brought you so much pleasure in the first place. Because of this growing dilemma, AEA is now considering a copyright protect scheme in which only 2 copies can be made (hard-drive etc.). You guys forced such limited versions and now we all must pay for your crimes. Think twice before you help that friend next time okay? Are you really helping him (us)? For the newest version of PC PAKRATT for IBM computers, contact AEA or any dealer handling their products. It should be available by the time you read this column.

It seems that the electronic industry has been coming up lately with devices for converting English into other languages. Little computer-like units that fit in the pocket are being carried by travlers as an aid for communicating with the locals when in foreign lands. Can the computer, that is in most shacks, someday become the vehicle for converting our English RTTY signals directly into the language of the recipient and vice-versa? You have no doubt discovered by now, if you partake in many RTTY contacts, that due to the language barrier, many of the foreign Hams "can" their signal reports and equipment list into the buffer in perfect English. This is fine, but when the buffer runs dry the DX station soon sends "TNX FOR NICE QSO DEAR OM - WILL QSL VIA THE BUREAU...73...SK". He or she is not brushing you off, it is just the inability or embarrassment of not being able to talk fluently in our language.

You must realize that most of the burden is being placed on the DX station, as in most instances it is they who are accomodating you as very few U.S. stations are attempting to convey communications in their language. I don't expect every one of you to run out and buy a Spanish or Russian dictionary, or register for a night time course in Italian, but there is an easy compromise.

When in contact with a DX station, send an occasional word or phrase in the language of the recipient. Don't make the mistake of starting a conversation with a foreign phrase, or the receiving station may get the false impression that you are fluent in their tongue. You will then be bombarded with a bunch of print that will mean nothing to you and you might be branded an imposter in his land! An initial greeting such as Buon Giorno or Guten Tag is fine. Then sprinkle a few words like S'il Vous Plait or Per Favor in the transmissions that follow. If the spelling is a bit wrong, you can always blame it on QRM.

I am including a basic list of foreign language suggestions in this issue for you to try on your next DX RTTY QSO. This list is comprised of simple words and phrases. You may want to add to it as you progress. I'll ask our Editor to outline this list and place it so you might want to cut it out and keep it handy near your keyboard (or simply make a photocopy of it if you do not want to destroy part of your bi-monthly issue. I am working on two other countries that make up a large portion of our DX contacts: Russian and Japanese. Until then - all I can say is Dosvidania and Sayonara.

You'll find I have also included some EXTRA RTTY information also in this issue. Included is a KB9OZ Worldwide RTTY PRESS Frequency List that took many hours to log and complete! Also included is a basic HOW TO GET STARTED ON AMTOR article pulled down from one of the Ham Telephone Bulletin Boards. Hope you had Happy Holidays and Good Luck with the New Year! 73s gang de Al WA2OQJ

BASIC MULTILINGUAL TERMS FOR RTTY
(courtesy of Nassau RTTY Assn.)

ENGLISH	FRENCH	GERMAN	ITALIAN	SPANISH
Hello	Bonjour	Guten Tag	Buon Giorno	Hola
Goodbye	Au Revior	Auf Wiedershen	A Rivederci	Adios
Yes	Oui	JA	SI	SI
No	Non	Nein	Noh	No
Thank You	Merci	Danke	Grazia	Gracias
Please	S'il Vous Plait	Bitte	Per Favore	Por Favor
What is your name?	Comment vous Appeles-vous?	Wie Ist Ihr Namen?	Come Si Chiama?	Como Se LLama?
What is your weather?	Comment Vos Temps?	Wie Ist Ihr Wetter?	Come Si Tempo?	Como Se Tiempo?
My name is	Je M'appelle	Mein Name Ist	Mi Chiamo	Me LLama
Please send QSL	Envoyer QSL S'Il Vous Plait	Sended QSL Bitte	Mandare QSL Per Favore	Mandar Por Favor
Signal Report	Signal Raport	Signal Bericten Ist	Signal Risposta	Senal Informar
Repeat	Repeter	Wiederholen	Interrogare	Repetir

Editors Note: Hey Al - I think you really got something here! Expand on it with other languages. -WB0QCD

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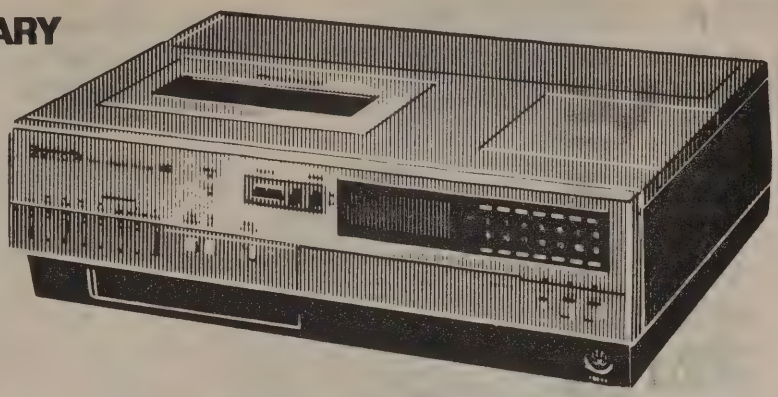
Write today for a FREE catalog listing of over 80 available VHS format (no BETA) videotaped and audiotaped productions of interest to the electronic hobbyist (SASE). Due to problems experienced during a previous offered RENTAL trial period, we now only distribute original first generation or re-duplicated material. Please allow 2-3 weeks delivery for #100 & #200 series orders. Tapes are sent by U.S. Mail or UPS in protective packaging. Send us YOUR 1 or 2-hour videotape production and if accepted as part of our growing library collection, pick out one of our #100 or #200 series programs absolutely FREE! Tapes marked by (*) have some sync breakup and multi-regeneration signal losses. Tapes marked with (+) are at 6-hour extended play program length and speed format. Our REPAIR TECHNIQUES Collection is produced and shipped directly from Tennessee in 2-3 days. Master Card or Visa Credit Cards Accepted (5% Added). Special C.O.D. delivery available on REPAIR TECHNIQUE tapes only (Add $3.00). All prices include tape. All Orders (except audiotapes) add $2.00 shipping/handling.



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109 Intn'l CAMPAL Series-All Around World
110 Intn'l CAMPAL Series-France with WB2LLB
111 Intn'l CAMPAL Series-Germany/Australia
112 Voyager Encounter Package! (with SSTV)
127 DAYTON ATV Workshops 1988 (2 tapes) +
128 Launch of Airene OSCAR 13 (6/88 French
135 Hello From America! USA to BATC Exchange
141 New Zealand ATV Activity from ZL1ABS
145 Central Texas ATV & 1,400 ft. Tower Ride Up!
163 Unseen Commercial TV Bloopers! Rated R + *
164 Early TV - Historical Collections (Narrated)
165 10 Years of Ham-TV (ATV from all over USA) +

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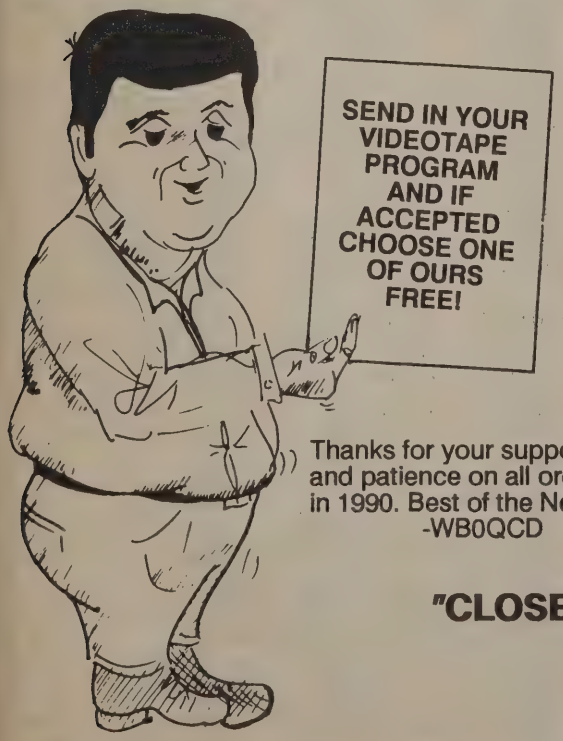
200 VIKING Lander, VOYAGER 1 & 2 - Audio & SSTV
201 Flight of Columbia STS-9 - Audio & SSTV (Specify 8, 12 or 36 second SSTV tracks)
204 SAREX 51H WOORE Flight - Audio & SSTV
210 Shortwave Radio RTTY FAX SSTV Signal DEMO

300 How To Use A Voltmeter (1 hr 51 min)
301 How To Use A Logic Proble And Logic Pulser
302 All About Resistors and their failure modes (1 hr)
303 All About Capacitors and their failure modes (1 hr 28 min)
304 All About Inductors and their failure modes, Part I. Includes inductors, transformers, flybacks, pinball coils
305 All About Inductors Part II - Includes magnetic clutches, relays all types, other devices (58 min)
306 All About Diodes and their failure modes. Includes rectifiers Zeners, triacs, LED's (55 min)
307 All About Transistors and their failure modes (56 min)
308 How To Solder Like A Pro - with lots of time saving circuit repair techniques including use of the revolutionary 7-second IC Remover (DEMO) (1 hr 30 min)
309 All About Electrical Contacts, connectors, connections and their failure modes, common and uncommon problems, symtoms & cures
310 How To Use An Oscilliscope (to track down digital failures)
311 How T Read Schematics and use them for troubleshooting, Part I Covers monitors, how to find monitor problems, wiring diagrams, symptoms, where to look, raster scan and X-Y monitors (56 min)
312 How To Troubleshoot Digital Intergrated Circuits - includes micro processors, what goes wrong and how to find it, how to use literature on IC's and where to get it (1 hr 45 min)
313 How To Select And Hire The Best Electronic Technician - It takes one to know one, and believe us, they are not all created equal! tape will save management a lot of grief from hiring a dud.
314 Best Money Making Ideas - (Amusement/Arcade) (56 min)
315 Videogame Repairs (for Arcade Games) (36 min)
316 Pinball Repairs (for Arcade Games) (44 min)
317 Videogame Monitor Repairs And Adjustments (31 min)
318 Pinball Theory (1 hr 29 min)
319 Videogame Theory (1 hr 12 min)
320 Job & Money Making Opportunities In Electronics (45 min)
321 Power Supplies - Linear and Switching (42 min)



Thanks for your support and patience on all orders in 1990. Best of the New Year!
-WB0QCD

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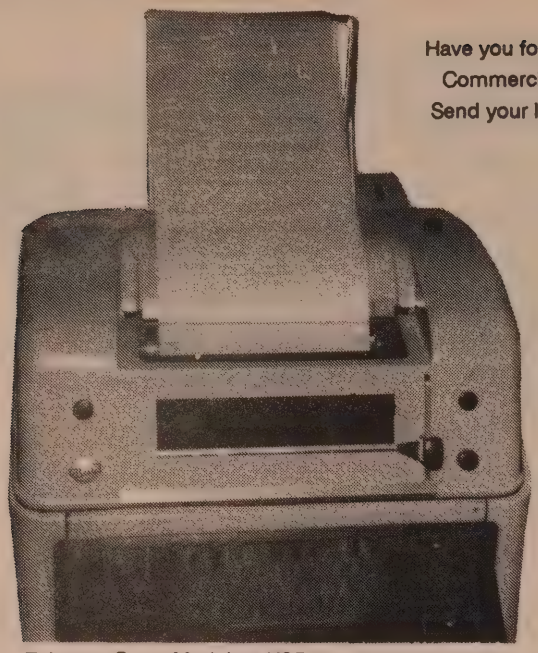

Have you found some interesting Commercial RTTY stations? Send your list to WA2OQJ today.

Teletype Corp. Model 28 KSR

Commercial/Government RTTY PRESS USA/Foreign Broadcast List by KB9OZ

Congratulations Al LaVorgna WA2OQJ on the new SPEC-COM/USATVS RTTY "AUTOSTART" Column! Here's my contribution.

The following is a list of frequencies where English language press stations can be found on HF. This list is from **personal monitoring** over the last 10 years and is **not** copied from any other lists. These press stations all transmit in English, some all the time, others just occasionally.

The "SB" column indicates USB or LSB to be selected for normal copy. The apostrophe next to the L or U indicates that the station is still on the air as of the last 12 months. (I don't drop any from the list unless I am sure they are no longer on).

The "SH" column indicates the shift (Mark to Space frequency difference) used. Note that most use 425Hz shift.

The "BD" column indicates the baud rate, not words per minute. This is standard Baudot RTTY code. Most foreign stations use "FIGS J" as the bell and "FIGS S" as apostrophe, which is the reverse of American machines.

The "M" in the "BD" column indicates that the station is a frequency division multiplex transmission, usually with 16 subcarriers. The shift is usually 85 Hz and many terminal units will not copy this. Receiving these FDM stations with the bfo off sounds like a buzz-saw. These stations are the best source of AP/UPI news, quite similar in format to the wire line press service sent to radio stations. The best way to tune these in is to select USB, tune onto the station from the high frequency side to the upper-most subcarrier. This subcarrier is usually the one carrying the news. The "SVC" column shows the abbreviation of the news service.

The "CALL" column is obvious. Not all stations give identify with a call sign. Some use the same call sign on all frequencies at once, and some have calls for each frequency in use, but do not indicate which call is for which transmitter. Not all stations of a particular service carry the same text. The VOA, for example carries as many as 4 different "programs" at the same time. the ARF, however, has the same text on all 4 frequencies at once.

I have not given times of transmissions. That is too difficult to pin down accurately. Many stations are on continuously. The frequencies given are within 2 kHz. Some stations do slide up or down a little, reverse their mark and space frequencies on occasion, and my receiver readout does not include the amount of bfo offset (about 1.5 kHz).

Happy tuning and let's hear from other USATVS RTTY mode enthusiast via this column! de **KB9OZ**

FREQ	SB	SH	BD	SVC	CALL	
2024	U	85	50M	AP/UPI	AFRTS	
4045	U'	85	50M	AP/UPI	AFRTS	
4515	U'	85	50M	AP/UPI	AFRTS	
4620	U'	85	50M	AP/UPI	AFRTS	
5435	L'	425	74	VOA	VOA	
5460	L'	425	74	VOA	VOA	
6834	U'	85	50M	AP/UPI	AFRTS	
6853	U	425	50	REUTER	GPE26	
6941	U'	170	74	VOA	VOA	
6983	U'	425	50	AP	GIC26B	
6992	U'	85	50M	AP/UPI	AFRTS	
7442	U'	425	74	VOA	VOA	
7478	U'	425	74	VOA	VOA	
7534	U'	85	50M	AP/UPI	AFRTS	
7784	U'	85	50M	AP/UPI	AFRTS	
7970	L	425	50	PL		
8000	U'	85	50M	AP/UPI	AFRTS	
8022	L'	425	50	AFP		
8029	U'	85	50M	AP/UPI	AFRTS	
8148	U	85	50M	AP/UPI	AFRTS	
8182	L	425	50	UPI	PDK68	
8192	L'	425	50	PAP	SOI31	
8506	U'	85	50M	AP/UPI	AFRTS	
9050	U	425	50	REUTER		
9102	U	425	50	REUTER		
9120	U'	425	50	REUTER	GPN29	
9214	U'	85	50M	AP/UPI	AFRTS	
9259	U'	85	50M	AP/UPI	AFRTS	
9285	U'	85	50M	AP/UPI	AFRTS	
9349	U'	425	50	AP	GIC29B	
9381	U'	85	50M	AP/UPI	AFRTS	
9397	L'	425	50	AFP	FTJ39A	
9405	U'	85	50M	AP/UPI	AFRTS	
9855	L'	425	74	VOA	VOA	
10134	U'	85	50M	AP/UPI	AFRTS	
10185	L	425	50	AFP	FPK8	
10413	U'	85	50M	AP/UPI	AFRTS	
10460	U'	425	74	U.N.	4UZ	
10543	L'	425	50	ADN		
10598	U'	425	50	VNA	VNA25	
10616	L'	425	50	AFP	FTK61	
10648	U'	425	50	AP	GIC30B	
10785	L'	425	50	ADN	Y2V43B	
10879	U'	425	50	TASS		
10880	U'	425	74	VOA	VOA	
10882	L'	425	50	REUTER		
10905	U'	85	50M	AP/UPI	AFRTS	
10958	U'	425	50	REUTER	GPE30B	
10960	U'	425	50	REUTER	GPEPI	AFRTS
11048	U'	85	50M	AP/UPI	AFRTS	
11170	L'	425	50	KCNA		
11539	U'	85	50M	AP/UPI	AFRTS	
11540	L	425	50	REUTER	GPE30B	
11599	U'	85	50M	AP/UPI	AFRTS	
11622	U'	425	50	PAP	SOL36	
12085	U	425	50	BAK	RCB55	
12128	L'	425	50	ANSA	IRJ31	
12185	U'	425	50	JANA		
12224	L'	425	74	VOA	VOA	
12280	U	425	50	AP	GBU32	
13238	U	85	50M	AP/UPI	AFRTS	
13410	L	425	50	VNA	VNA16	
13438	L'	425	50	DPA		
13460	U'	425	50	VNA	VNA16	
13487	L'	425	50	ANSA	ISX35	
13490	U	425	50	BAK	RCG77	
13493	U	425	50	TASS	RCG77	
13504	L	425	50	KCNA	MVS19	
13563	U'	850	50	CNA	3MA22	
13580	L'	425	50	KCNA	MVS19	
13598	L	425	50	CETEKA		
13612	U	425	50	REUTER		
13623	U'	425	50	REUTER		
13625	U'	425	50	REUTER		
13626	U'	425	50	REUTER		
13628	U	425	50	REUTER		
13648	L'	425	50	CETEKA		
13652	U'	425	50	MENA	SUA50	
13676	U'	85	50M	AP/UPI	AFRTS	
13730	L'	425	50	AFP		
13770	L'	425	74	VOA	VOA	
13895	L'	425	50	ADN	Y2V47	
13898	L	425	50	ANSA		
13975	L'	425	50	ANSA	ISX19	
13995	L'	425	74	VOA	VOA	
14360	U	425	50	PAP		
14366	U'	425	50	XINHUA		
14523	U	425	50	REUTER	GPN34	
14525	L'	425	74	VOA	PRS	
14547	L	425	50	KYODO	JAL44	
14562	U'	85	50M	AP/UPI	AFRTS	
14565	U'	425	50	PL		
14568	L	425	50	KCNA	HML61	
14572	U'	425	50	JANA		
14631	L'	425	50	ANSA		
14638	L'	425	74	ARF	WFK54	
14698	U'	425	50	TASS	REB24	
14718	U'	425	50	KYODO		

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14720 U  425 50  BAK      RKB58
14762 U  425 50  GNA
14796 L' 425 50  AFP
14800 L  425 50  ADN      DMV241
14825 L' 425 50  ADN      Y2V25
14832 U  425 50  KUNA
14901 L' 425 50  PL       CLN450
14901 L' 425 50  TASS
14928 L' 425 50  PL       CLN452
14974 U' 425 50  AP       GBW34B
15462 L' 425 50  JANA
15480 L' 425 50  KCNA
15482 L' 425 50  APS
15506 L' 425 50  CETEKA
15693 L' 425 50  ANSA     ISX56
15694 L' 425 50  ANSA     ISX56
15743 L' 425 50  VNA      VNA5
15749 U'  85 74  VOA      VOA
15750 U'  85 74  VOA      VOA
15865 U  425 50  BAK      RBK79
15865 U' 425 50  TASS     RRG26
15875 L' 425 74  VOA      VOA
15896 U'  85 50M AP/UPI   AFRTS
15898 L' 425 50  CETEKA
15930 U  425 50  BAK      RBI78
15977 L' 425 50  AFP
15980 L' 425 50  AFP
15992 U' 425 50  INDFO    WER26
15996 L' 425 50  DPA
16055 U  425 50  INDFO    WER45
16092 U'  85 50M AP/UPI   AFRTS
16108 L' 425 50  AFP
16133 U'  85 50M AP/UPI   AFRTS
16135 U' 425 50  XINHUA   BZP54
16149 U  425 50  NEWS
16223 U  850 50  CNA      3MA35
16247 U' 425 50  PL
16336 U' 425 50  PL
16342 U' 425 50  TANJUG   YZJ4
16347 U' 425 50  TASS
16348 U' 425 50  PL
16348 U' 425 50  TASS
16403 L' 425 50  ADN      Y2V57
16415 L  425 50  ADN
17210 L  170 74  AFRTS
17210 U  425 50  XINHUA
17370 U  425 50  BAK      RBI73
17390 U  425 50  PL
17393 L' 425 50  PL       CLN565
17415 L  425 50  PL
17475 L  425 50  PL
17509 U  425 50  TASS     RFD53
17519 U  425 50  TASS
17525 L  425 50  CETEKA   OLV3
17545 L' 425 50  AFP
17552 U   85 50M AP/UPI   AFRTS
17555 U' 425 50  MAP      CNM73
17564 U'  85 50M AP/UPI   AFRTS
17565 U  425 50  AP       GIW37B
18005 L  425 50  PL       CLN603
18012 U  425 50  PL
18050 U' 425 50  TASS
18101 U' 425 50  REUTER   GPU30
18159 U  425 50  TASS     RTU47
18193 U' 425 50  PL       CLN603
18198 U' 425 50  PL
18205 U'  85 50M AP/UPI   AFRTS
18245 U   85 50M AP/UPI   AFRTS
18261 L' 425 50  KUNA
18272 U   85 74  VOA      VOA
18292 U  425 50  PL
18307 L' 425 50  KUNA
18331 U  425 50  REUTER
18333 U' 425 50  REUTER   GPE38B
18335 U' 425 50  REUTER   GPE38
18384 U  425 50  TASS     REB24
18392 U'  85 50M AP/UPI   AFRTS
18434 U'  85 50M AP/UPI   AFRTS
18519 L'  85 50  AFP
18540 U  425 50  PL
18543 L' 425 74  ARF      WFK48
18547 U  425 50  AP       GIY38B
18671 L' 425 50  AFP      FTS67
18675 L  425 50  IINA
18682 U  425 50  REUTER
18700 L' 425 50  DPA
18787 U' 425 50  SUNA
18824 L' 425 50  ADN      Y2V38A
18835 U' 425 50  TASS     RWN74
18871 U  425 50  XINHUA
18988 L  425 50  CETEKA
19148 U  425 50  XINHUA   BAJ29
19162 U'  85 50M AP/UPI   AFRTS
19171 U' 425 50  MAP      CNM85
19280 L' 425 74  UN       4UZ
19565 L' 425 50  ANA
19818 U'  85 50M AP/UPI   AFRTS
19825 L  425 50  OANA
19865 U' 425 74  TANJUG   YZJ4
19975 U  425 50  LPS
19981 U  425 50  PARS
20008 U' 425 50  BAKTAR
20080 L' 425 50  AFP
20085 L' 425 50  ANSA     ISX20
20100 L  425 50  REUTER
20105 L' 425 50  DIPLO    HSF212
20110 L  425 50  AFP
20152 U   85 50M AP/UPI   AFRTS
20155 L' 425 50  KUNA
20204 U  425 50  TANJUG   YZJ
20312 L' 425 50  AFP
20386 U' 425 50  REUTER
20420 L' 425 50  ADN      Y2V20A
20421 L' 425 50  ADN
20430 L' 425 50  ANSA     IRS24
20483 L' 425 74  VOA      PRS
20494 U  425 50  PAP      SOV249
20506 U  425 50  KUNA
20559 U' 425 50  JANA
20625 U'  85 50M AP/UPI   AFRTS
20728 L' 425 50  ANSA     IRS27
20776 U' 425 50  INDINFO
20804 U  425 50  KUNA
20837 U   85 50M AP/UPI   AFRTS
21784 L' 425 50  KUNA
21787 U' 425 50  KUNA
21801 L   85 74  VOA      VOA
21839 U  425 50  TASS
22760 U' 425 50  AP       DZK79
22781 U  425 50  TASS     RDD73
22782 L' 425 74  ARF      WFN62
22790 U' 425 50  TASS
22813 L' 425 50  ADN      Y2V29
22885 L' 425 50  ADN
22909 U  425 50  KUNA
22918 U'  85 50M AP/UPI   AFRTS
22955 L  425 50  ANSA
23315 U'  85 50M AP/UPI   AFRTS
23499 U'  85 50M AP/UPI   AFRTS
23542 U' 425 50  REUTER   GLF43
23751 L  425 50  AFP
23770 L' 425 74  ARF      WFG93
24029 U'  85 50M AP/UPI   AFRTS
24089 U   85 50M AP/UPI   AFRTS
24790 L  425 50  ANSA     ISX24
25377 L' 425 50  ANSA     IRX23
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This File Complements Of KB9OZ Mailbox System

Here is a list of RTTY Press Frequencies I think you will find interesting. Conditions will affect when you can receive them best. The list is of English translations only...Good Hunting...

UTC	FREQ	SHIFT	SPEED	SERVICE	FROM
W					
0300	6984	425	66	AP	LON
0300	9119	425	66	REU	LON
0300	9850	170	100	TASS	MOS
0300	10649	425	66	AP	LON
0300	19520	425	66	UPI	VICT
0400	6870	425	66	TASS	MOS
0400	6984	425	66	AP	LON
0400	9349	425	66	AP	LON
0500	10959	425	66	REUT	LON
0500	17510	425	66	TASS	MOS
0500	18385	425	66	TASS	MOS
0500	22782	425	66	TASS	MOS
0530	10649	425	66	AP	LON
0530	12085	425	66	TASS	MOS
0530	14710	425	66	TASS	MOS
0530	17570	425	66	MH	MOS

THIS LIST WAS COMPILED BY STEVE, WB1ERG, IN LYNN, MASSACHUSETTS

FREQUENCY	AGENCY	SHIFT/SPEED	GMT
5460	USIA	425/75	2215-0745
6942	USIA	425/75	2230-0745
7442	USIA	425/75	2330-0530
7478	USIA	425/75	2330-0530
10380	USIA	425/75	0800-1500
10880	USIA	425/75	2330-0245
12223	USIA	425/75	2215-0745
13770	USIA	425/75	2215-0745
13995	USIA	425/75	2330-0445
14901	TASS	425/50	1745-2030
20430	ANSA	425/50	0800-1400

THE HALIFAX STATIONS ALSO BROADCAST
WXFAX 4061.5,
8140, 8130, & 13624.

A GOOD LIST CAN BE FOUND IN "CONFIDENTIAL FREQENCY LIST " FROM GILFER SHORTWAVE. ALMOST ALL RTTY SIGNALS AT 425 SHIFT CAN BE COPIED. THIS IS THE STANDARD SHIFT FOR THE PRESS.

MODE	FREQ.	SHIFT	RATE	CODE	REV.	STATION	CONTENT
RTTY	14.3555	450	50	BAUDOT	ON	BRACKNELL U.K.	FULL SYNOPTIC EUROPE
RTTY	10.5355	850	76	BAUDOT	ON	?	HRLY AIRP. CANADA&US
RTTY	13.5095	850	76	BAUDOT	ON	HALIFAX	HRLY AIRP.MAINLY CANADA
USB	8.054	---	100	FEC	?	MOBILE(WOO)	MARINE FORCASTS
USB	6.5023	---	100	FEC	ON	?	?
RTTY	12.5005	?	50	BAUDOT	OFF	?	WX CODE
RTTY	12.2236	?	76	BAUDOT	OFF	?	WX CODES
RTTY	10.5513	170?	50	BAUDOT	ON	?	WX CODES
RTTY	7.9796	850	100	BAUDOT	ON	?	WX CODES
RTTY	7.6244	450OR 850	100	BAUDOT	OFF	?	WX CODES
RTTY	4.2704	850	76	BAUDOT	ON	HALIFAX	HRLY AIRP CODES

NONE OF THE ABOVE APPEAR TO BE U.S. BASED STATIONS BROADCASTING THE FULL NATIONAL WEATHER SERVICE STATION REPORTS (THESE ARE FIVE-DIGIT CODES FOR 6 HOURLY SURFACE UPPER-AIR OBSERVATIONS, AS WELL AS HURRICANE ADVISORIES AND FORECASTS).

UNDERSTANDING AMTOR SIGNALS

RTTY AUTOSTART Column Extension Article

[Roaming around the telephone computer BBS's the other day, WB0QCD found this interesting article about AMTOR. It was DOWNLOADED off the WB2COY Amateur Radio BBS out east. The "author" is partially unknown (N?ANL) but did one heck of a nice writing job explaining the AMTOR signal and how the everything works between locked operators to those of us who are as yet unfamiliar with the mode. If anyone knows who was the originating author, please write to us. I present this article here in my e-x-t-e-n-d-e-d RTTY AUTOSTART Column as additional information to USATVS Members. -WA2OQJ]

UNDERSTANDING AMTOR DATA SIGNALS

Since they were introduced several years ago, many thousands of all-mode data controllers have been sold. I'm referring to the AEA PK232 and PK64, and the Kantronics KAM. These units offer a mode of communication called AMTOR. Most people who purchase one of these units do so primarily for packet use, but are curious about AMTOR. They would like to try the mode, but hesitate because they don't understand it. Unfortunately, the manuals that come with the all-mode units do a very poor job of explaining it. This article will be an attempt to make AMTOR simple.

HISTORY BACKGROUND

First I want to discuss how and for what purpose it was developed, and to offer a plain-language explanation of how it works. During the nineteen seventies, the Dutch government developed a system of digital communication called SITOR. It was designed to provide reliable RTTY communication under adverse conditions, while still maintaining an extremely low error-rate. The SITOR protocol was meant primarily for maritime use. It was so reliable a system that it was soon in use world wide. In the early 1980's, Peter Martinez, G3PLX, made several minor changes to the SITOR protocol and called it AMTOR. The FCC authorized its use by U S amateurs beginning in January of 1983.

THE AMTOR SIGNAL

AMTOR is different than any digital mode you may have used, in that it is the only synchronous type of RTTY authorized at the present time. "Synchronous" means that the two stations in an AMTOR ARQ contact are synchronized (linked) with each other. There are three modes in AMTOR. The first is ARQ, an acronym for Automatic Repeat Request, sometimes called Mode A. It makes the familiar chirp chirp sound you have often heard. The second mode is FEC, an acronym for Forward Error Correcting. It is sometimes called Mode B. The sound of an FEC transmission is similar to that of Baudot RTTY. The third mode is called Mode L, the Listen mode. It allows an operator to decode an ARQ signal even though he is not one of the two stations that are linked.

ARQ

Let's talk about the ARQ mode. Let me begin by describing what's called the "ARQ Cycle". It is 450 milliseconds in length. It starts with the information sending station transmitting a data-burst consisting of three characters. Since AMTOR uses a seven-bit code, and the data-transfer rate is fixed at 100 baud, this data-burst takes 210 milliseconds. Next there is an 85 millisecond period of silence, during which the receiving station checks the 3 characters for validity. If the data-burst passes the check, the receiving station prints it, and sends back a single character control code. This takes 70 milliseconds. The control code (an ACK) says, "OK, I got it, send the next burst". If the data-burst does not pass the check, the receiving station prints nothing and returns a control code (a NAK) that says "Hey, I didn't get it. Send it again". The sending station will continue to repeat the data-burst until it gets an ACK. The control code is followed by another 85 milliseconds of silence, and the cycle begins again with either the next data-burst if the information sending station received an ACK, or a repeat of the last data-burst if it got a NAK.

ERROR FREE?

The AMTOR ARQ mode has often been referred to as error free. That is not quite true. Errors are possible, but the error rate is so extremely low that it is VIRTUALLY error free. The method of error detection used is quite simple. Five of the bits in each character of the AMTOR code are information bearing bits. The other two are used for error detection. The five information bearing bits in each character are identical to the five information bearing bits for that character in the Baudot code. Each of the two error detection bits can be either a mark or a space. The code is arranged so that every AMTOR character contains four marks and three spaces. A three character data-burst then, contains a total of twelve marks and nine spaces. All the information receiving station must do therefore, is count the total number of marks and spaces in the data-burst it received to detect whether or not there has been an error. While data is not being transferred, the information sending station transmits idle signals to maintain the link.

LINKING

Please note that throughout this description of the AMTOR ARQ mode I have referred to the "information sending station" and the "information receiving station". This is because when two stations are linked in Mode A, both are transmitting at intervals, thus it would be incorrect to refer to one as the "transmitting station" and the other as the "receiving station". In an ARQ link, the timing is set by the station that initiated the contact. It is called the "master" station, with the other station being the "slave". The second mode we will discuss is FEC. This mode is not synchronous, and the stations involve are not linked, but they do operate in phase with each other. In order for them to stay in phase, each FEC transmission is started with several sets of "phasing pairs". These are repeated at regular intervals during the course of the transmission, so that the two stations can stay in phase. While no data is being transferred, idle signals are transmitted to keep the two stations in phase.

MODE-B

In Mode B, each character is transmitted twice, 350 milliseconds apart. The receiving station prints a character the first time it is received if the mark/space count is correct. If it was received correctly the first time it was sent it was printed, and will be ignored the second time it is received. If it was incorrect the first time it was received, it is ignored, and will be printed the second time it is sent if it is received correctly. This method of error detection is much less effective than that used in ARQ, and the error-rate is considerably higher than it is in that mode. Although higher than in ARQ, the error-rate is still far lower than it is in other forms of RTTY.

MODE-L

The third AMTOR mode is called Mode L, or the "Listen" mode. It allows an operator to print ARQ data-bursts even though he is not linked to the information sending station. There is no error detection at all in the Listen mode, and if the station being monitored is asked for repeats (RQ's), they will be printed.

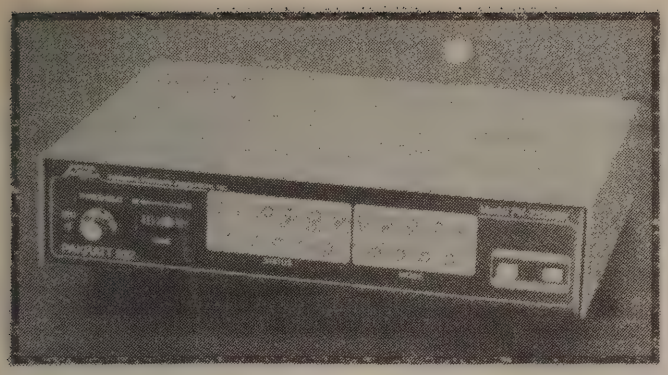
LSB & FREQUENCY

Before discussing AMTOR operation, I want to explain two conventions that that are used in all three types of RTTY. The first is that lower sideband ONLY is used regardless of operating frequency. Failure to observe this practice will result in reversed tones, known as an "upside-down" signal. The second convention regards how the frequency of operation is specified. In single sideband or CW operation it is simple. If you are on say, 14,100.00 and you are told to "move to 14,050.00", you just dial up the new frequency. In RTTY when a frequency is specified, it does not refer to the frequency shown on your display or dial. It refers to the frequency at which your MARK TONE signal appears, regardless of what your display reads. This may seem complicated, but there is a very good reason for it to be done this way.

AFSK and FSK

Before I explain, let me mention two terms that may not be familiar to you. One is Audio Frequency Shift Keying (AFSK), and the other is Frequency Shift Keying (FSK). When operating AFSK, your transmitter is keyed by the PTT line, and you feed mark and space tones into the microphone jack. Since you will be on the lower sideband, your mark tone signal will appear to be a carrier 2125 Hertz below the frequency shown on your display. When operating FSK, tones are not used. Your transmitter is keyed by the PTT line, and produces a carrier just as though it was in the CW mode. The FSK line from your data controller is merely opened and closed. As it opens and closes, it shifts this carrier by 170 Hertz.

In FSK operation, where your mark tone signal appears depends on the radio you are using. It can appear either 170 HERTZ ABOVE, or DIRECTLY ON the frequency shown on your display. Remember, the station you are in contact with does not know whether you are using AFSK or FSK. If you asked him to move to another frequency, specified as shown on your display, he would need know this. Also, if you are using FSK, he would need to know whether your particular radio shows the position of the mark or space tone signal on its display. Using this convention to specify frequency eliminates all this. An operator need only know where his own mark tone signal is relative to his display, and specify his frequency accordingly. The other operator, using this convention, can then tune him correctly regardless of whether he is using AFSK or FSK.



WHICH METHOD IS THE BEST?

It is my experience, at least with my equipment, that FSK is the most desirable method to use. That is because using the 500 Hertz filter eliminates a great deal of QRM, and I cannot use it in the lower sideband mode. If your radio allows you to use this filter while in lower sideband, then it really doesn't make much difference whether you use AFSK or FSK.

SELCAL

Since the two stations in an ARQ contact are synchronized, they must recognize each other, and the called station must respond ONLY to a call directed specifically to it. For this reason a SELCAL system is used for identification. Selcal is an acronym for Selective Call. The convention is to derive your selcal from the first and the three trailing letters of your callsign, thus my selcal would be NANL. In the case of a one-by-two callsign such as W1AW, the first letter is repeated, followed by the two trailing letters, so its selcal would be WWAW. If the callsign is a two-by-one, the first letter is repeated twice, followed by the trailing letter. The selcal of KK9H, for example, would be KKKH. A two-by-two callsign such as KB9SV, results in a selcal of KBSV. For a two-by-three callsign like KA9ABC, the selcal would be KABC. While it is not necessary to follow this convention, since any four letters can be a selcal, it is a good idea to do so. If you do, then any operator who knows your callsign can deduce your selca!.

MAKING THAT AMTOR CONTACT

There are three ways to initiate an ARQ contact in AMTOR. You can call CQ, you can respond to another stations CQ call, or you can call a specific station. In the first case, always call CQ in the FEC mode, NOT ARQ. When you do this, be sure to include your selcal. Following your CQ, return to AMTOR Standby and wait for a reply. If you receive a response to your CQ, it could be in FEC, although it is much more likely that it will be in ARQ. If the response is in ARQ, your station will begin the ARQ cycle, and you will see that idle signals are being received. At this point, the link is established and your station is ready to receive text. Now the other operator need only open his transmit buffer, type the text, and it will be sent to you. ,

UH..OH, SOMETHING'S WRONG

If text stops appearing on your screen, just stand by. Your station is probably requesting repeats because it received a data-burst incorrectly. You will soon receive the block correctly, and traffic will begin to flow again. When the other station is ready to receive information from you, he will turn the link over to you, and it will be your turn to send text to him. He will do this by sending you a turnover sequence. That is the two characters Plus-Question mark" (+?). You will know when the turnover has been made by the change in rhythm of your stations transmissions. Before the turnover, your station was sending single character data-bursts 70 milliseconds in length. When the turnover occurs, it will begin transmitting three character data-bursts 210 milliseconds in length. When the turnover has been made, simply open your transmit buffer and begin typing text for transmission.

CHARACTER BLOCKS

When you are transmitting text in ARQ, you will see it pop onto your screen in three character blocks, as the blocks are acknowledged by the receiving station. If this text stops appearing and nothing seems to be happening, it just means that the receiving station is requesting repeats because it received the last data-burst your station sent incorrectly. Stand by. The incorrect block will soon be acknowledged, and traffic will flow again. When you are ready to receive text again, reverse the link by sending the turnover sequence (+?).

ANSWERING A CQ

The second way to initiate a contact is to answer another stations CQ. When a station calls CQ in FEC, its selcal should be included. If it is not, you can deduce what it is. To answer the CQ, just start an ARQ transmission. When you do this, your program will ask for the selcal of the station you wish to call. When you enter it, the ARQ cycle will start, with your station transmitting the other stations selcal. You will soon hear the other station responding with control codes, and you will see an indication that your station is sending idle signals. Now the link is established. Just open your transmit buffer and type in 6 text for transmission. When you are ready for the other stations reply, send the turnover (+?) and reverse the link.

CALLING ANOTHER STATION

The third way to initiate a contact is to call a specific station in ARQ. Usually, this will happen when you have been watching an ARQ contact in the Listen mode, and you want to call one of the stations when they finish. In this case, since you have been "eavesdropping", you already know the selcal of the station you want to call. You also know it is on frequency, since the contact has just been terminated. Call your station by starting an ARQ transmission just as though you were replying to a CQ call.

CONTROL CODES

There are two control codes used in AMTOR that you should be familiar with. The first is "Control-C". It is used to force a changeover. If the other station in an ARQ link is information sending station, and you want to reverse the link without waiting for it to send the changeover sequence, you can do so by sending it a Control-C. The second code is "Control-D". It is used to break an ARQ link. An ARQ contact should ALWAYS be ended with a Control D.

There are a couple of other things to be aware of. The T/R switching time of your rig should be on the order of 25 milliseconds for best ARQ operation. All newer rigs and most older ones easily meet this standard. Some rigs though, designed before AMTOR came into use, may require simple modifications. Notably, these are the Kenwood TS930S, and the earlier ICOM rigs. In any case, if you are in doubt, a call to the manufacturer will get you any information you need. Since the ARQ cycle requires your rig to return to full receive sensitivity quickly, always set your AGC for fast release, or turn it off entirely.

WHERE TO FIND AMTOR SIGNALS

Most AMTOR activity will be found on 20 meters. Look for it around 14,075.00. You will also find activity around 3,650.00, 7,050.00, and 21,075.00. I hope I've made AMTOR easier for you to understand than the manual you got with your data controller did. If you enjoy a good rag chew, it's lots of fun. Give it a try. 73's and stay tuned to The SPEC-COM Journal for MORE upcoming AMTOR helpful information! -WA2OQJ

Al LaVorgna WA2OQJ

Very few correctly named last issue's "FUNNY HAM" contest (NOV/DEC page 11). Even without his glasses - he was still Al LaVorgna WA2OQJ, our RTTY Editor! For those of you who entered and guessed right - we extended your subscription. TNX!

SHORTWAVE RADIO MONITORING by Mike Donovan KA0JAW

During my very busy work schedule and travels around the country and world, when I do get a chance to spend time on the radio hobby, I try to devote some time per month to shortwave radio listening (SWL). It is relaxing to "roam the airwaves" tuning in on non-Amateur type signals. I especially like trying to decode unknown data signals on RTTY band operating areas (see RTTY PRESS list in Al LaVorgna's column elsewhere in this issue). Shown below, is a listing of known SHORTWAVE stations, where and what they transmit. I hope this list assists many of you in finding what you are in the mood to listen to. We will try to have more SHORTWAVE articles in future issues of our Journal since so many of you also have a separate General Coverage receiver plugged in and sitting next to your Ham gear. 73's -KA0JAW

USATVS SHORTWAVE FREQUENCIES BAND GUIDE

FREQ BAND KHZ	CODE	SERVICE	COMMENTS
535 - 1705	LOCAL	AM Broadcast	Standard North America AM
1705 - 1800	FIXED	Fixed Service	Land/Mobile/Marine
1800 - 2000	HAM	Amateur 160 Meters	
2000 - 2107	MARINE	Maritime Mobile	
2107 - 2170	FIXED	Fixed Service	Land/Mobile/Marine
2170 - 2194	MOBILE	Land Mobile Service	
2194 - 2300	FIXED	Fixed Service	
2300 - 2495	SWBC	Shortwave Broadcast	120 Meters
2495 - 2505	TIME	Time Standard	
2505 - 2850	FIXED	Fixed Service	Land/Mobile/Marine
2850 - 3155	AIR	Aeronautical Mobile	Transoceanic Flights
3155 - 3200	FIXED	Fixed Service	
3200 - 3400	SWBC	Shortwave Broadcast	90 Meters
3400 - 3500	AIR	Aeronautical Mobile	Transoceanic Flights
3500 - 4000	HAM	Amateur 80/75 Meters	
3500 - 3750	CW	Amateur 80 Meter CW	Extra
3525 - 3750	CW	Amateur 80 Meter CW	Advanced, General
3700 - 3750	CW	Amateur 80 Meter CW	Novice, Technician
3750 - 4000	PHONE	Amateur 75 Meter PHONE	Extra
3775 - 4000	PHONE	Amateur 75 Meter PHONE	Advanced
3850 - 4000	PHONE	Amateur 75 Meter PHONE	General
3900 - 4000	SWBC	Shortwave Broadcast	75 Meters, Not in Region 2
4000 - 4000	TIME	Time Standard	New WARC Allocation Region 3
4000 - 4063	FIXED	Fixed Service	
4063 - 4438	MARINE	Maritime Mobile	Ship / Shore
4438 - 4650	FIXED	Fixed Service	
4650 - 4750	AIR	Aeronautical Mobile	Transoceanic Flights
4750 - 5060	SWBC	Shortwave Broadcast	60 Meters
5000 - 5000	TIME	Time Standard	WWV
5005 - 5450	FIXED	Fixed Service	
5450 - 5730	AIR	Aeronautical Mobile	Transoceanic Flights
5730 - 5950	FIXED	Fixed Service	
5950 - 6200	SWBC	Shortwave Broadcast	49 Meters
6200 - 6525	MARINE	Maritime Mobile	Ship / Shore
6525 - 6765	AIR	Aeronautical Mobile	Transoceanic Flights
6765 - 7000	FIXED	Fixed Service	
7000 - 7300	HAM	Amateur 40 Meters	
7000 - 7150	CW	Amateur 40 Meter CW	Extra
7025 - 7150	CW	Amateur 40 Meter CW	Advanced, General
7100 - 7150	CW	Amateur 40 Meter CW	Novice, Technician
7150 - 7300	PHONE	Amateur 40 Meter PHONE	Extra, Advanced
7225 - 7300	PHONE	Amateur 40 Meter PHONE	General
7100 - 7300	SWBC	Shortwave Broadcast	41 Meters, Not in Region 2
7300 - 8195	FIXED	Fixed Service	
7335 - 7335	TIME	Time Standard	CHU Canada
8000 - 8000	TIME	Time Standard	New WARC Allocation Region 3
8195 - 8815	MARINE	Maritime Mobile	Ship / Shore
8815 - 9040	AIR	Aeronautical Mobile	Transoceanic Flights
9040 - 9500	FIXED	Fixed Service	
9500 - 9900	SWBC	Shortwave Broadcast	31 Meters
9775 - 9995	FIXED	Fixed Service	
10000 - 10000	TIME	Time Standard	WWV
10005 - 10100	AIR	Aeronautical Mobile	Transoceanic Flights
10100 - 10150	HAM	Amateur 30 Meters	CW Only
10100 - 10150	CW	Amateur 30 Meters	Extra, Advanced, General
10100 - 11175	FIXED	Fixed Service	
11175 - 11400	AIR	Aeronautical Mobile	Transoceanic Flights
11400 - 11650	FIXED	Fixed Service	
11650 - 12050	SWBC	Shortwave Broadcast	25 Meters
12050 - 12330	FIXED	Fixed Service	
12330 - 13200	MARINE	Maritime Mobile	Ship / Shore
13200 - 13360	AIR	Aeronautical Mobile	Transoceanic Flights
13360 - 13600	FIXED	Fixed Service	
13600 - 13800	SWBC	Shortwave Broadcast	New WARC Allocation
13800 - 14000	FIXED	Fixed Service	
14000 - 14350	HAM	Amateur 20 Meters	
14000 - 14150	CW	Amateur 20 Meters	Extra
14025 - 14150	CW	Amateur 20 Meters	Advanced, General
14150 - 14350	PHONE	Amateur 20 Meters	Extra
14175 - 14350	PHONE	Amateur 20 Meters	Advanced
14225 - 14350	PHONE	Amateur 20 Meters	General
14350 - 14995	FIXED	Fixed Service	
15000 - 15000	TIME	Time Standard	WWV
15010 - 15100	AIR	Aeronautical Mobile	Transoceanic Flights
15100 - 15600	SWBC	Shortwave Broadcast	19 Meters
15600 - 16460	FIXED	Fixed Service	
16460 - 17360	MARINE	Maritime Mobile	Ship / Shore
17360 - 17550	FIXED	Fixed Service	
17550 - 17900	SWBC	Shortwave Broadcast	16 Meters
17900 - 18030	AIR	Aeronautical Mobile	Transoceanic Flights

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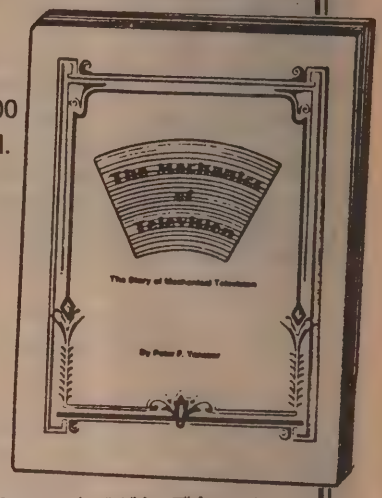

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18900 - 19680	FIXED	Fixed Service	
19680 - 19800	MARINE	Maritime Mobile	Ship / Shore
19800 - 21000	FIXED	Fixed Service	
21000 - 21450	HAM	Amateur 15 Meters	
21000 - 21200	CW	Amateur 15 Meters	Extra
21025 - 21200	CW	Amateur 15 Meters	Advanced, General
21100 - 21200	CW	Amateur 15 Meters	Novice, Technician
21200 - 21450	PHONE	Amateur 15 Meters	Extra
21225 - 21450	PHONE	Amateur 15 Meters	Advanced
21300 - 21450	PHONE	Amateur 15 Meters	General
21450 - 21850	SWBC	Shortwave Broadcast	13 Meters
21850 - 22000	AIR	Aeronautical Mobile	
22000 - 22720	MARINE	Maritime Mobile	Ship / Shore
22720 - 23200	FIXED	Fixed Service	
23200 - 23350	AIR	Aeronautical Mobile	
23350 - 24990	FIXED	Fixed Service	
24890 - 24990	HAM	Amateur 12 Meters	Shared with above Fixed Sve.
24890 - 24930	CW	Amateur 12 Meter	Extra, Advanced, General
24930 - 24990	PHONE	Anateur 12 Meter	Extra, Advanced, General
25000 - 25000	TIME	Time Standard	
25010 - 25330	INDUST	Petroleum Industry	
25330 - 25600	GOVERN	Government Freq.	
25600 - 26100	SWBC	Shortwave Broadcast	11 Meters
26100 - 26480	MOBILE	Land Mobile Service	
26480 - 26950	GOVERN	Government	
26950 - 26960	FIXED	International Fixed Sve	
26960 - 27410	CB	Citizen's Band	Channels start at 26965 by 10
27410 - 27540	MOBILE	Land Mobile Service	
27540 - 28000	GOVERN	Government	
28000 - 29700	HAM	Amateur 10 Meters	
28000 - 28300	CW	Amateur 10 Meter	Extra, Advanced, Genral
28100 - 28200	CW	Amateur 10 Meter	Novice, Technician
28300 - 28500	PHONE	Amateur 10 Meter	Novice, Technician
28300 - 29700	PHONE	Amateur 10 Meter	Extra, Advanced, General
29700 - 29800	INDUST	Forestry Service	
29800 - 29890	FIXED	Fixed Service	
29890 - 29910	GOVERN	Government	
29910 - 30000	FIXED	Fixed Service	

The SPEC-COM Journal would like to hire a paid SHORTWAVE RADIO Columnist to report some of the things that are happening on the SWL bands. Are you an active SWL enthusiast? Do you "log" several hours per month of listening? Got a computer, a modem and can your write? Drop us a line today. We've got column space ready for you! Write to: Editor Mike Stone WB0QCD at R2 Box 86. Clarence, Iowa 52216. Include a sample column is possible.

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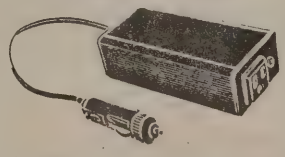

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"SPACE TALK" OSCAR & NASA News Column

with Joe Holman KA7LDN
P.O. Box 37, Redman, Washington 98073

Since AO-13's launch, this satellite has been providing many amateurs from all over the world the opportunity to talk to other amateurs. In this article, I would like to discuss the very basics of the bird, and what you need to know in terms of equipment to make your first QSO via the bird.

AO-13, a Phase III satellite, allows you to operate on many different bands. Each of these bands receive/transmit signals via a transponder. More specificly, a transponder receives signals on one band and retransmits the signals on another band. AO-13 carries four different transponders that does just this - they are: B, JL, S, and RUDAK(Note 1). These transponders use the following general sets of uplink and downlink frequencies:

Actual Frequency Ranges
435.423-435.573/145.975-145.825
144.423-144.473/435.990-435.940
1269.351-1269.731/436.005-435.677
435.636-435.602/2400.749-2400.715

To communicate on the B, JL, and S transponders, you will need to transmit using LSB and receive with USB. This is the standard convention used by satellite operators for most satellite transponders. And, remember, the transponders are inverting, we means as you you go up in frequency on your uplink, your downlink signal will go down in frequency. What radios can you use for space communications? Well, many are available, and below is a list of common radios that work well for satellite communications. You will note that all of these radios have both LSB and USB capabilities.

Brand	Model	Band
ICOM	IC-271	2 m
ICOM	IC-471	70 cm
ICOM	IC-1271	13 cm
ICOM	IC-275	2 m
ICOM	IC-475	70 cm
ICOM	IC-970	2 m, 70 cm, 13 cm
KENWOOD	TS-711	2 m
KENWOOD	TS-811	70 cm
KENWOOD	TS-790	2 m, 70 cm, 13 cm
YEASU	FT-726	2 m, 70 cm, 13 cm
YEASU	FT-736	2 m, 70 cm, 13 cm

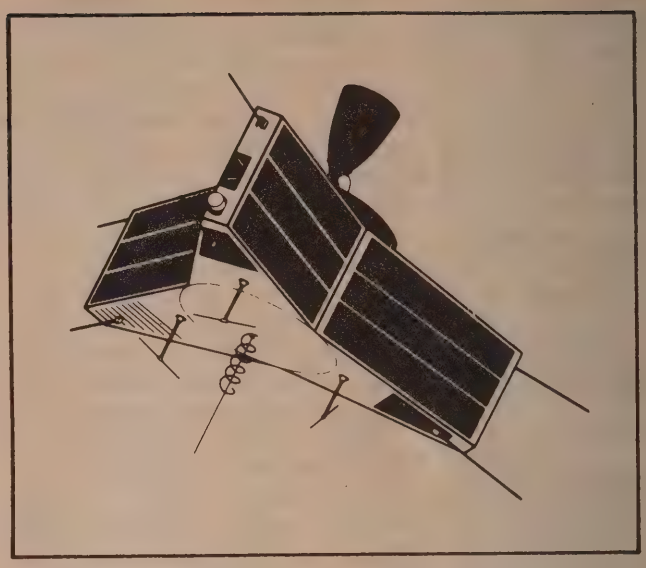
In addition to a good receiver, you should mount a preamplier at your antenna to increase the signal strength of incoming signals. Some signals coming from the satellite are very weak, and must be amplified. If you currently have your preamplifier mounted at the back of your receiver, take a few minutes and experiment with how much more a signal is increased by placing it at the antenna - you'll be pleasantly surpised! Also, use Belden 9913 coax cable between your antenna, preamplifier, and receiver. Belden 9913 provides the least amount of loss for the dollar.

Your uplink requirements are pretty much determined by how much EIRP (Effective Isotropic Radiated Power) is required to put a sufficient signal into the bird's transponder. EIRP is be calculated by adding the power (in dBW) at the antenna feed point to the gain of your antenna (in dBi). For example, if you have a 15 dBi antenna and you are have 13 dBW of power at the antenna feed point, then you have 28 dBW EIRP (15 dBW + 13 dBi = 28 dBW EIRP = = 635 W EIRP). For conversion purposes, here is a chart which helps converting Watts to dbW:

dBW = 10 log (P), where P is expressed in watts

P	dbW
1	0
2	3
5	7
10	10
20	13
50	17
100	20
200	23
500	27
1000	30

For OSCAR-13, here are the recommended minimum EIRP requirements for each transponder in order to have 20 db peak and 10 db average SNR on the downlink your signal:



AMSAT PHASE 3

Mode	Recommended Minimum EIRP
B	21.5 dBW
J	25 dBW
L	25 dBW
S	27 dBW

Note: Be sure to take the power reading AT THE FEEDPOINT of your antenna. Do not take the power measurement from the back of your radio because your feedline also has loss which must be subtracted from the equation stated above! (i.e. power gain - cable loss + antenna gain = EIRP) As calculated above, your antenna should provide enough gain so as to provide suitable EIRP to the transponder. Many commercial antennas meet these requirements and are readily available. Although you can use linear polarized antennas, most amateur satellites use RHCP (right hand circular polarization). This means that the satellite's downlink signals are transmitted in a circular fashion, that is - a clockwise rotation. If you use a linear polarized antenna, instead of a RHCP antenna, you may experience serious QSB on occasion. By the way, most RHCP antennas avaialable have gain in the range from 12.5 to 15 dBi.

As you can see, mixing and matching various types of gear is possible and usually the case for operating satellites - the main thing to remember is to always use a preamp at the antenna and meet your EIRP requirments. CU on the birds - Joe Holman, KA7LDN

Note 1: The RUDAK (digipeating system) has not been implemented yet.

Current Orbital Elements

```
Satellite: UO-14
Catalog number: 20437
Epoch time:      90322.73966395
Element set:     276
Inclination:       98.6895 deg
RA of node:        38.3096 deg
Eccentricity:     0.0012144
Arg of perigee:    62.1098 deg
Mean anomaly:     298.1325 deg
Mean motion:    14.28790482 rev/day
Decay rate:       5.34e-06 rev/day^2
Epoch rev:            4293

Satellite: AO-16
Catalog number: 20439
Epoch time:      90321.45796366
Element set:     174
Inclination:       98.6939 deg
RA of node:        37.2320 deg
Eccentricity:     0.0012540
Arg of perigee:    68.5913 deg
Mean anomaly:     291.6607 deg
Mean motion:    14.28888085 rev/day
Decay rate:       5.18e-06 rev/day^2
Epoch rev:            4275
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```
Satellite: DO-17
Catalog number: 20440
Epoch time:      90323.12914980
Element set:     175
Inclination:       98.6933 deg
RA of node:        38.9183 deg
Eccentricity:    0.0012719
Arg of perigee:    64.4348 deg
Mean anomaly:     295.8146 deg
Mean motion:   14.28947046 rev/day
Decay rate:      5.61e-06 rev/day^2
Epoch rev:           4299

Satellite: WO-18
Catalog number: 20441
Epoch time:      90323.45856257
Element set:     175
Inclination:       98.6935 deg
RA of node:        39.2837 deg
Eccentricity:    0.0013221
Arg of perigee:    63.5656 deg
Mean anomaly:     296.6882 deg
Mean motion:   14.29028895 rev/day
Decay rate:      5.05e-06 rev/day^2
Epoch rev:           4304

Satellite: LO-19
Catalog number: 20442
Epoch time:      90323.65401460
Element set:     176
Inclination:       98.6925 deg
RA of node:        39.5106 deg
Eccentricity:    0.0013586
Arg of perigee:    63.2006 deg
Mean anomaly:     297.0565 deg
Mean motion:   14.29101116 rev/day
Decay rate:      5.21e-06 rev/day^2
Epoch rev:           4307


Satellite: SALYUT 7
Catalog number: 13138
Epoch time:      90324.13915245
Element set:     650
Inclination:       51.5979 deg
RA of node:       225.2984 deg
Eccentricity:    0.0003738
Arg of perigee:   138.5517 deg
Mean anomaly:     221.5796 deg
Mean motion:   15.84350908 rev/day
Decay rate:     1.3497e-03 rev/day^2
Epoch rev:           48938

Satellite: MIR
Catalog number: 16609
Epoch time:      90324.63000519
Element set:     107
Inclination:       51.6125 deg
RA of node:       262.5174 deg
Eccentricity:    0.0032955
Arg of perigee:   276.2838 deg
Mean anomaly:      83.5125 deg
Mean motion:   15.61042347 rev/day
Decay rate:     3.1994e-04 rev/day^2
Epoch rev:           27253

Satellite: HUBBLE
Catalog number: 20580
Epoch time:      90324.10087612
Element set:     337
Inclination:       28.4730 deg
RA of node:       336.9839 deg
Eccentricity:    0.0005772
Arg of perigee:   306.4636 deg
Mean anomaly:      53.5305 deg
Mean motion:   14.85552048 rev/day
Decay rate:     4.467e-05 rev/day^2
Epoch rev:           3117

Satellite: BADR-1
Catalog number: 20685
Epoch time:      90323.91477224
Element set:     205
Inclination:       28.4766 deg
RA of node:       160.5894 deg
Eccentricity:    0.0217108
Arg of perigee:    92.4124 deg
Mean anomaly:     270.0894 deg
Mean motion:   15.81905876 rev/day
Decay rate:     8.2450e-03 rev/day^2
Epoch rev:           1940
```

For more information about amateur satellites,

contact AMSAT-NA

301-589-6062

and tell Martha that Joe sent you!

Over the past year, The SPEC-COM Journal and The USATVS national ATV organization, has been working closely with Mr. Bill Anderson, Executive Assistant at Marshall Space Flight Operations Center in Huntsville, AL and NASA SPACELINK Computer BBS SYSOP for the development of an up to date, NASA SELECT Ham Radio Relay Database. It took some time and doing, but here it is! Copies have been forwarded also to Ms. Rosalie White at the ARRL in Newington and to the FCC in Washington, D.C.. This list will also be published jointly in RADIOSCAN Magazine.

80 known systems (DEC 1990)

Latest Update - STS-35 Mission

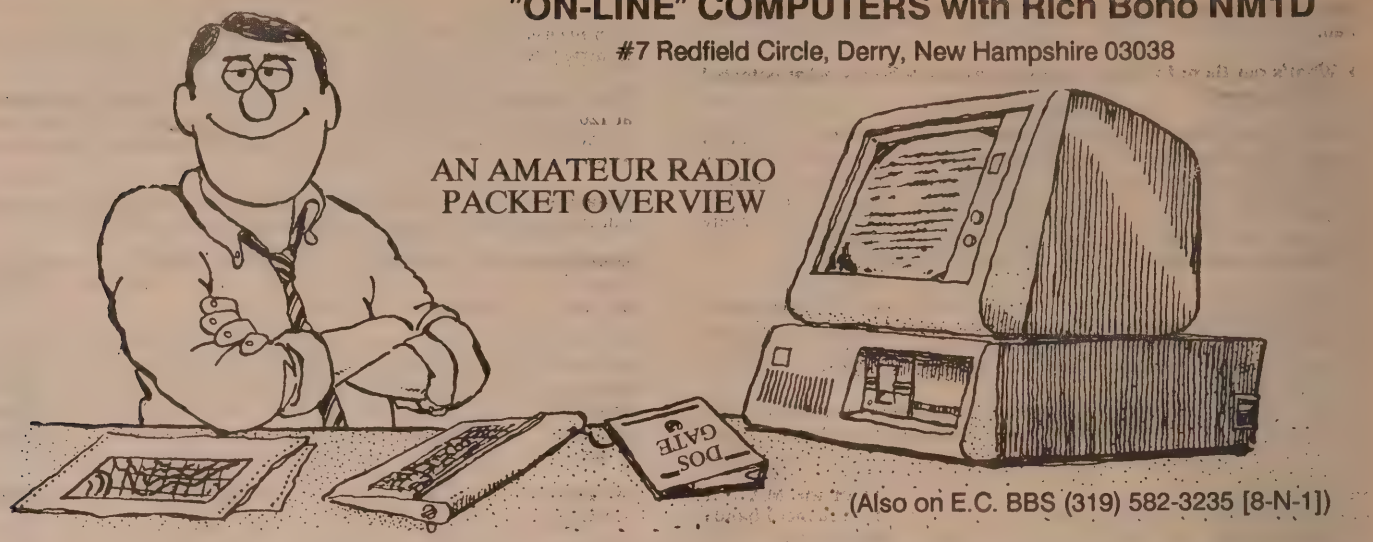
(C) 1991 SCC&PG Ltd

USATVS "NASA SELECT" AMATEUR RADIO RELAY DATABASE

Location	ST	Call	Frequency	Mode	Sponsor	Source
Decatur	AL	N4UV	147.100	FM Audio	North Ala DX Club	NASA
Birmingham	AL	N4AHN	147.150	FM Audio		WB4CXD
			145.380	FM Audio		NASA
Huntsville	AL		147.100	FM Audio		NASA
Phoenix	AZ		449.000	FM Audio		NASA
			448.975	FM Audio		NASA
		WV7K	427.250	ATV Video	Norm Sharpe	W6ORG
Tucson	AZ		448.625	FM Audio		WA6CDR
Bakersfield	CA	N6TFQ	146.430	FM Audio	Bakersfield	USATVS
			427.250	ATV Video		W6ORG
Los Angeles	CA	WA6CDR	448.500	FM Audio	Mt. Wilson/SCAL	NASA
			145.460	FM Audio		NASA
			224.040	FM Audio		NASA
			448.825	FM Audio		NASA
			52.640	FM Audio	Cactus System	WA6CDR
Mt. Wilson	CA	K6KMN	1241.25	ATV Video	Mt. Wilson/SCAL	W6ORG
San Francisco	CA	W6NKF	427.250	ATV Video	Mt. Diablo	W6ORG
San Joaquin V	CA	WD6BNO	52.220	FM Audio	Bakersfield/Stocktn	ARRL
Mountain View	CA		145.580	FM Audio	Ames ARC	NASA
Sacramento	CA	N6HOS	923.25	ATV Video	J. Buckman	W6ORG
Santa Barbara	CA	WB9KMO	1277.25	ATV Video	WB6HQZ	W6ORG
San Diego	CA		448.625	FM Audio	Cactus System	WA6CDR
Denver	CO	N0IVN	426.250	ATV Video	Western Vision Net	USATVS
	CT		448.425	FM Audio		NASA
Cape Canaveral	FL	K4GCC	146.940	FM Audio	Merrit Island	NASA
CoCo Beach	FL	K4GCC	434.000	ATV Video	LISATS ATV Group	USATVS
Daytona Beach	FL	K4BV	144.340	FM Audio	Vic Leisner	W3LGV
			421.250	ATV Video		W6ORG
Jacksonville	FL	WD4AOG	147.120	FM Audio		USATVS
Merrit Island	FL	K4GCC	146.940	FM Audio	Kennedy SFC	W6ORG
Vero Beach	FL		145.130	FM Audio	Ft. Pierce	KB4PLH
Forsyth	GA	W4SPJ	147.315	FM Audio		ECBBS
Ashburn	GA	WD4EVD	147.285	FM Audio	Coastal Plains	ECBBS
Cedar Rapids	IA	NN0V	146.400	FM Audio		USATVS
		NN0V	439.250	ATV Video		USATVS
			TV-13	TV Video	COX Cable Channel	NASA
Maquoketa	IA	WB0QCD	427.250	ATV Video	M.A.T.S.	USATVS
Boise	ID	N7MOE	145.250	FM Audio	Bryan Rayl	W6ORG
Chicago	IL		145.210	FM Audio		NASA
Downers Grove	IL	K9ZNE	426.250	ATV Video	Lee Bateman	W6ORG
Hillsboro	IL	K9SM	144.340	FM Audio	Scott Millick	USATVS
			439.250	ATV Video		W6ORG
Waldron	IN	W9NTP	439.250	ATV Video		USATVS
Annapolis	MD	WB4APR	144.930	FM Audio	Bob Bruninga	W6ORG
			923.250	ATV Video		W6ORG
Portland	ME	KA1SSZ	146.925	FM Audio	Portland/York	NASA
Mt.Agamearkus	ME	K1MON	224.840	FM Audio		NASA
Dearborn	MI	K8OCL	224.460	FM Audio	John Champa	AMSAT
			1277.25	ATV Video		W6ORG
Minneaplois	MN	WB0BQG	147.120	FM Audio	3M ARC	USATVS
			145.150	FM Audio		NASA
Waseca	MN		147.450	FM Audio		NASA
			427.250	ATV Video		NASA
Joplin	MO	W0TQR	146.460	FM Audio	Ron Colt	W6ORG
			421.250	ATV Video		W6ORG
Tulsa	OK	WA5LVT	145.580	FM Audio	Mike Reynolds	W6ORG
			421.250	ATV Video		W6ORG
Omaha	NB	WB0HEU	421.250	ATV Video	G.O.A.T.S./CH-6	WB0CMC
Charlotte	NC	W4PPN	421.250	ATV Video	Charlotte ATV Grp.	USATVS
El Paso	NM		448.650	FM Audio		NASA
Las Vegas	NV		449.000	FM Audio		NASA
		KB7BY	1253.25	ATV Video	Jeff Gomes	W6ORG
Columbus	OH	W8DMR	147.450	FM Audio	Bill Parker	ATCO
			439.250	ATV Video		W6ORG
Dayton	OH	WB4LAI	145.110	FM Audio	Kettering Medical	NASA
Greenville	OH	WA8KZR	146.790	FM Audio		NASA
Portland	OR	WA7DRO	146.430	FM Audio	Dennis Belles	W6ORG
			1277.25	ATV Video		W6ORG
York	PA	W3HZU	426.250	ATV Video	Keystone ARC	USATVS
Arlington	TX	WB5EPI	448.750	FM Audio	Texas VHF Society	NASA
Beaumont	TX	KE5O	421.250	ATV Video	Steve Gomez	W6ORG
Dallas/Ft.Wor	TX	K5OJI	145.310	FM Audio		KB5BFJ
Houston	TX	W5RRR	146.640	FM Audio	Johnson SC Center	NASA
Kilgore	TX	K5KFC	145.450	FM Audio	Dave Baxter	W6ORG
			426.250	ATV Video		W6ORG
Tyler	TX	W5KPZ	145.450	FM Audio	Dave Baxter	W6ORG
			421.250	ATV Video	CATV Tower	W6ORG
Salt Lake City	UT	WA6CDR	448.625	FM Audio		NASA
Alexandria	VA	WA9GVK	426.250	ATV Video	Metrovision ARC	USATVS
Wausaw	WI	AD9W	144.340	FM Audio	Dean Andrewjeski	USATVS
			421.250	ATV Video		USATVS

"ON-LINE" COMPUTERS with Rich Bono NM1D

#7 Redfield Circle, Derry, New Hampshire 03038



(Also on E.C. BBS (319) 582-3235 [8-N-1])

The following is the result of a non-amateur asking some basic questions about amateur packet radio. Several of us thought that this information would be useful to others who are interested in amateur packet operations. Thanks to Tim Dayger for asking the right questions, and to Patty Winter (N6BIS) for her editing skills. I hope that this will be of help to many others. I love working with computers and designing software. Packet Radio is just one of my favorite Amater Radio modes of operation. Yes, you video nuts will be glad to hear that I am also an active ATVer as well. While this particular article is about the basics of Packet Radio, future columns shall take on different subjects and modes involving computers. I am glad to be writing now as a regular editor for SPEC-COM, The USATVS Journal. I hope some of you will write back and tell me of your particular experiences and/or what you would like to see within these assigned pages. -Rich Bono (NM1D)

Our potential amateur packet radio operator asks: I've used networks, on-line services, and bulletin board systems (BBS) for years, but I've never really paid much attention to amateur packet radio. I'm starting from scratch, and need to have some idea of where to begin.

Q. Just what IS amateur packet radio?

A. Amateur packet radio is (yet another) digital transmission method available for use via amateur radio. It provides 'error free' transmission and reception of messages (information/data/etc.) between two stations. This error-free capability is a prime consideration. Error free in this context does not mean that your typing or spelling mistakes will be fixed, but that all transmitted 'data' will be received 100% intact, as sent. In fact, if the data cannot be delivered 100% intact, the transmission is eventually aborted and the user is informed that there is no longer a connection between the two stations.

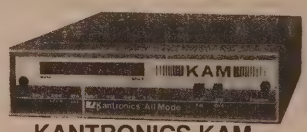
The 'packet' in 'packet radio' comes from the method of transmitting your information over the air. Your data is broken up into packets (or blocks) that are transmitted. Each packet contains the sending and the receiving station call-signs and some optional routing information. A packet can contain from 0 to 256 data (or information) bytes. The users normally do not need to be concerned with this 'packetizing' of their messages. Each packet is sent and then acknowledged by the receiver when received. If a packet is not received correctly, then it is automatically re-transmitted (up to a maximum number of times). You normally don't have to know about all this to use packet radio. The 'packetizing' happens automatically, without any thought or actions required by you.

One of the more popular protocols used for amateur packet radio is known as AX.25. This is somewhat similar to the commercial X.25 standard. There is also a growing TCP/IP user base. If you are not network oriented, then the details of these protocols are not important to you as an operator of a packet radio station. Be aware that most packet radio operation at this time is at 1200 baud. This will seem slow when compared to what it happening on networks, and on telephone BBSs.... but what is gained is world-wide access, for NO COST.

Once you have your equipment, and your license, there are no fees (except for the electricity that your computer and other equipment use). There are a growing number of amateurs who are experimenting with 2400 and even 9600 (or higher) baud operation, so it shouldn't be too long before these faster rates become very popular!

Q. What kind of equipment do I need, and how do I use it with my PC?

A. Since you own a PC, you already own the most expensive part of an amateur packet radio station. The other piece of equipment that you need is the TNC (terminal node controller). The TNC contains all the software and special hardware that you need. It actually contains the modem (to interface with your radio) and (usually) a microprocessor with the packet software contained in EPROM. You interface your PC (or even a simple dumb ASCII terminal) with the TNC via serial RS-232. Use your favorite terminal emulation software on your PC (the same software that you use with your telephone modem will probably work fine). This is just as easy as connecting your computer to a modem. If you don't want to use the serial port of your computer, there are TNCs available that will plug directly into the bus. If you don't have a PC (personal computer), then almost any RS-232 ASCII terminal will work with most of todays TNCs.



KANTRONICS KAM

The most popular packet frequencies in the USA are in the two-meter band (144-148 MHz). Check out the following frequencies (they may be different in your area; ask a local amateur if you don't hear anything). Even the typical 'police scanner' can be used to listen to these frequencies:

145.01, 145.03, 145.05, 145.07, 145.09 MHz

If the above are busy, many areas also use:
144.91, 144.93, 144.95, 144.97, 144.99 MHz

Yes, this is with an average FM transceiver set for SIMPLEX operation (transmitting and receiving on the same frequency). If there are packet radio transmissions you should hear a sound like:

BBBBbbbbbrrrrraaaaaaapppppppp

Q. How much technical or hardware proficiency is required to use a packet radio system?

A. If you can plug an RS-232 cable into a modem, and wire the TNC to your radio, then you have all the ability that you need. I am sure that there are hams in your area who would be glad to help you if you are not comfortable with wiring a microphone connector. Most TNCs connect to the microphone plug of an FM transceiver, normally only needing push-to-talk and transmit audio connections, and a connection to the speaker audio output from the FM receiver. This consists of about five wires, and can usually be done without removing the covers of the radio (these are normally external connections).

Installation really is very simple, and once it is done, there is virtually no maintenance. Just plug in your TNC in place of your microphone and external speaker, and you're on the air... to return to voice operation, plug in your microphone. If you like, build a simple switch box to allow easy changing between your TNC and voice operation. I don't recommend it, but some people wire the TNC and microphone in

parallel, so that they don't need to change the plugs, or switch anything at all.

Q. What's out there for me to access via packet radio and what potential is there for growth?

A. This is the interesting part! I believe that packet radio is still in its infancy. It seems like every day a new application for packet radio is announced... some are good ideas... others not. By the time you read this, a lot of the information presented here will probably be out of date; yes this technology is progressing!!! Here is a *simple* list that barely highlights some of the available uses of amateur packet radio.. I am SURE that I have forgotten something and left it off the list:

EMAIL: At this time we have world-wide email (electronic mail) distribution. I personally have received email from a few continents, and from all over the USA. Of course, this is limited by the amateur radio rules and regulations, so there cannot be any commercial messages.

LOCAL NETWORKS: Here in New England we have connectivity over most of the region. I can connect to other stations from the following areas consistently: Canada (Montreal), Vermont, New Hampshire, Maine, Connecticut, Massachusetts, Rhode Island and New York. I should note that I am located about 10 miles north of the MA/NH border (in Derry, NH). Of course, on the HF (high frequency) bands there can be world-wide connectivity, depending on many factors.

PACKET-CLUSTER DX SPOTTING: This is a specialized system that allows a couple of hundred users to be connected to the same system at one time. It is used by those amateur operators who seek contacts with rare stations throughout the world. When any one user 'finds' a rare station on the air, he simply types the information (call-sign, frequency and mode) into his terminal, and within a minute or so, all of the other users are informed of the rare station!!! So-called "DXers" (people who like to hunt these rare stations) LOVE this system. These users can be spread over a wide area. Our local packet cluster system has connectees from Maine to New York.

DOSGATE: A system that allows you to execute programs remotely. A DOSGATE system may have many programs for you to use over the air. You don't need to download the programs to use them; you are actually running programs remotely. DOSGATE allows those who don't have a computer to run programs via packet radio. For example, my DOSGATE system has the following programs available for use by remote packet users:

AUTOEXAM: Take sample amateur exams from Novice to Extra. You can use AUTOEXAM as a study guide, or to see if you are ready for a certain license exam.

SeeSats: Real time satellite tracking. Informs you of where the current OSCAR (and other) satellites are located.

AUTOCALL: On-line amateur radio USA call-sign lookup database. Simply enter the call-sign of any amateur radio operator in the USA and it will print out the name, address, license class and previous call-sign (if any).

GAMES: Several adventure-style games that can be played on-line.

Repeater database: A database of many of the repeaters in the area.

Gateways: Even though you may not own any HF or UHF equipment (many packet radio operators only use a simple hand-held VHF transceiver), you can gain access to other bands and operating modes by using a gateway. A gateway allows connectivity between two normally non-connectable communication technologies. In many areas not only are there major BBSs on the standard two-meter Technician class frequencies and the 222 MHz Novice class sub-band, but there are cross-band gateways available as well. A Novice on the 222 MHz band can connect to a station on the 145 MHz band by going through a gateway and be able to communicate with many other amateurs.

Public Service: Many packet stations are used to help out with sending messages during disasters. Amateur radio operators help out whenever they can, and many hams have their packet stations ready for portable operation to help when needed. There are many training exercises during each year to help practice and test the readiness of the emergency stations.

OSCAR Satellites: OSCAR stands for Orbital Satellites Carrying Amateur Radio. We have our OWN satellites in orbit that are dedicated for amateur radio use. There are some satellites that are dedicated to packet radio (sometimes called "PACSATS"). These are for 'store-and-forward' operations to help distribute packet traffic around the world.

Bulletin boards: These carry postings similar to the stuff on Usenet (or telephone BBSs) and often have archives of useful files (such as local ham license testing sites). These are usually the same packet nodes that transport email.

File transfers: Better at 56 Kbaud (as some hams are doing), but feasible at 1200 baud. On TCP/IP, you just start it and forget it, so you can do it overnight or at some other time when you don't care whether it takes a while.

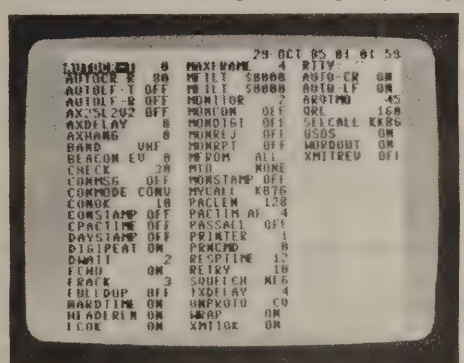
Databases: In some areas there are HAZMAT (hazardous materials), call-sign, and repeater databases accessible via the network.

Station-Station: I almost forgot.. many people simply enjoy chatting with their neighbors.... This could be with people across the street... or in the next state... or half-way around the world!

I am sure that I have missed something. You asked about potential... as I mentioned at the beginning, we are just getting started!!! Many people are just finding out about packet radio. I believe that the only limitation is our imagination!! We could have a world-wide network (we do currently have a 'slow-speed' world-wide network) in the near future... It just takes a little imagination...

Q. How much will a packet radio set-up cost me? How COST EFFECTIVE is packet radio?

A. Well, if you own the PC already... TNCs can be purchased from about $120.00 on up. There are a few for less money, and several that provide for operating on many digital modes in addition to packet radio (i.e., the Kantronix KAM will provide for packet (HF:300 baud/VHF:1200 baud), AMTOR, RTTY, ASCII, NAVTEX, WEFAX, CW (Morse code),...). If you already own an amateur FM transceiver (or an HF SSB transceiver) then you have all the equipment needed. If not, a two-meter FM transceiver can be purchased for used from $100-250.00, new from $300.00 on up. Cost effective.... Hmmm, well first be aware that amateur radio cannot be used for any commercial or business purposes... But where else can one get hours (years) of enjoyment and



service out of $470.00 ($350 for a radio and $120 for a TNC, assuming you already have the computer or terminal). Note: This stuff can be contagious.... be forewarned!!

Q. What legal issues do I need to consider regarding packet radio? Do I need a license?

A. Yes, you need a valid amateur radio license. There is (in the southern New Hampshire area) packet radio activity on the Novice bands. But if you want access to the mainstream of packet radio, you will want at least a Technician amateur radio license. (Although, as mentioned earlier, some areas have an active packet radio network that is accessible with the Novice amateur radio license.)

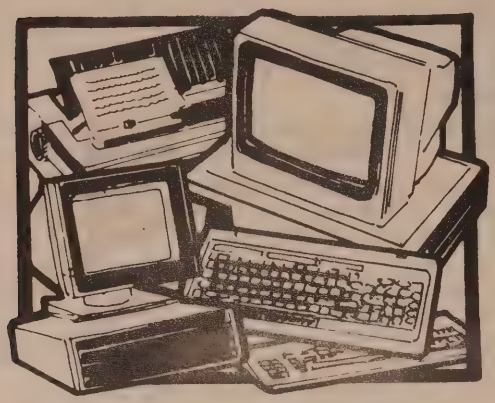
Q. I've tried reading about amateur packet radio, but a lot of it is Greek to me. Please suggest some reading materials such as books and magazines that my campus or local libraries might carry.

A. There are a few books, etc... but I have found that most assume that you already know about amateur radio. You need to find what we call (ready for another term?) an "Elmer". An "Elmer" is a friendly, helping amateur radio operator who will take you under his/her wing to help and guide you as much as you need. I hope that you can find someone to help you... it takes a special kind of person to be an 'Elmer' (gosh I hate that term).

Good luck with your packet radio activities. If you find this information helpful, I would be glad to hear from you.... How? Simply send me a message via the amateur packet network, NM1D@WB1DSW.NH.USA.NA from anywhere in the world! Or, just drop me a line and let me know I helped you a bit in my new SPEC-COM Column. 73's de NM1D

PACKET RACKET

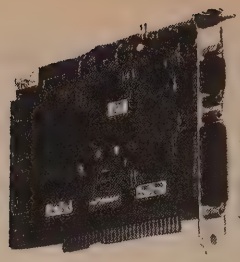
By Mike Donovan KA0JAW



As the appeal of digital modes, including packet, continues to lure new operators into specialized communications - we see extended product lines in the offing. AEA brings us the new (as reviewed Sept/Oct issue) PK-232MBX multi-mode data controller with PacMail, AMTOR, TDM for SWL receiving, WEFAX, Host Mode Packet (for TCP/IP), RTTY, CW and more! MFJ has their high performance mulit-mode unit including multi-gray level FAX and SSTV modem. DRSI brings us a expansion slot adapter to get us on the air fast and easy. The improved Kantronics dual port controller continues to be very popular as does the PacComm condensed portable packet controller. A & A Engineering offers Commodore users two systems to join the packet excitement.

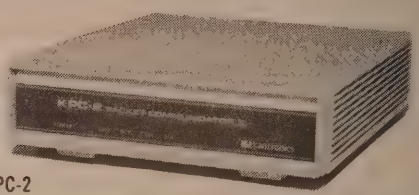
AEA PK-232MBX Multimode Data Controller

With all this interest, it is safe to declare that the interfacing of computers and communications is a mania that is here to stay! Now that we have affiliated with the ELECTRONIC COTTAGE National Telephone BBS, it is easy for you to share your public domain software with others. As you know, I prefer TCP/IP packet operation and will be placing the latest version of the code on the BBS for your critique and use. The newer versions now support RLI type forwarding that will let your TCP/IP board interact with the many AX.25 boards around. TPC/IP takes a little effort to learn but is well worth the investment of time. If you have written or use public domain software to interface your computer with our hobby in anyway please share with the rest of us by uploading the code and documentation.



DRSI (Digital Radio Systems)
PC*Packet Adapter System
for IBM PC and Clones
Packet Radio with out a Packet TNC!

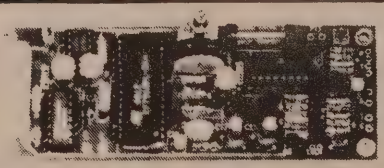
While digital modes can provide hours of diversion as well as practicable applications it can also bestow challenges. As proprietor of two nodes facilitating the vicinity I have recently been kept quite busy repairing, replacing, and debugging equipment. Mother Nature has been fiendish this year with her phenomena of lighting taking out two rigs and two of my data controllers. A word to the wise - protect your equipment with appropriate grounding. We found, after extensive damage that another service sharing the isolated site was not protected allowing all kinds of stray surges to fly around. Computer disk problems have kept my packet bbs off the air. We have now lost our site the DBQ Node was running and I am actively seeking a new location.



KANTRONICS KPC-2

I am currently learning the world of FIDONET and making many interesting messages available on the EC BBS as well as on my TCP/IP packet bulletin board. The new MICROSAT's supply hams with substantial data in the form of AX.25 telemetry. The AMSAT MICROSAT group has offered several programs to translate the live data into usable information. If you are interested in what is available contact AMSAT Headquarters at (301) 589-6062. A switching device sitting within reach from your operating position will allow you to select feeds to your data controller. You can easily switch input from your HF rig, SW receiver, VHF/UHF rig, Scanner, or tape recorder. This can be a simple, but helpful, project for you shack. The alternative is a mess of wires, lost signals, and hours of frustrating cable switching. I favored a junkbox push button gang switch that mechanically pops one of the six switches out when another on is chosen. You can find these in many recorders, appliances, and other equipment. A small project box, seven mini phone plugs, and some wire was all that was needed to finalize this simplistic, yet effective audio switch box that will support six input feeds to my data controller.

As I said, the digital modes can provide hours of diversion? Building and maintaining systems can be a lot of fun and I urge you to share by submitting your building, operational, or hints articles for this digital mode section. We want your input so sit down with pen (or computer) in hand today. I am busy building the needed equipment to decode WEFAX satellite information and will report on that at a later time. I hope Santa stuffed your stockings with all the digital and computer paraphernalia that your heart earns for and that I see (print) you on the bands soon. 73's and Happy New Year. -KA0JAW



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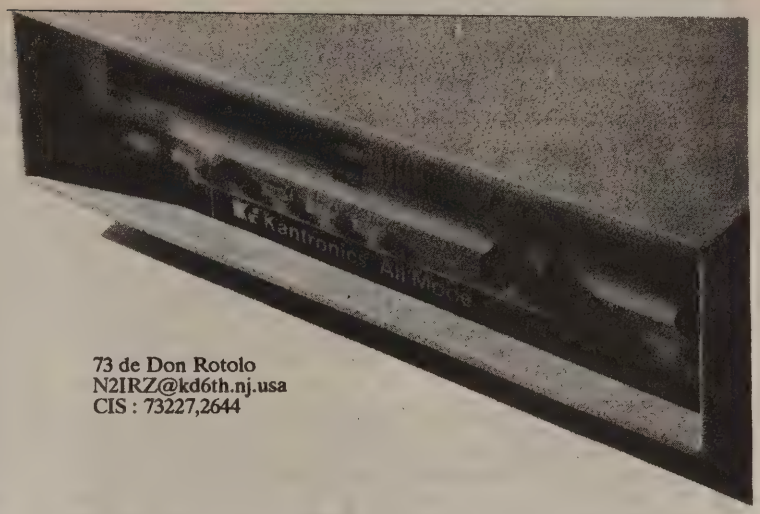
We are looking for PUBLIC DOMAIN IBM, COCO or Commodore 64 Ham Radio Software to add to our growing FREE available library collection on our Electronic Cottage BBS. Upload (use [=] operating area) or send us a disk full of working programs? Disks returned if requested. Call **(319) 582-3235** (300-2400 baud at 8-N-1) or mail your disks to: Bill Fay KA0FDI, 1285 Rockdale, Dubuque, IA 52001. Thanks!

UNDERSTANDING MONITORED PACKET FRAMES

Written for The USATVS Journal by Don Rotolo N2IRZ



73 de Don Rotolo
N2IRZ@kd6th.nj.usa
CIS : 73227,2644

Have you ever monitored the packet channel and wondered just what all those letters and numbers at the beginning of each packet "frame" mean ? Well, wonder no more ! This article will explain the basics of packet control.

All packet HDLC (High-level Data Link Control) frames are similar, consisting of 6 unique "fields":

| Flag | Address | Control | PID & Data | FCS | Flag |

FLAG : The Flag fields are put at the beginning and end of each frame to indicate the boundaries of the frame. A unique bit sequence is used (01111110) so other parts of the frame won't be mistaken for a Flag. ADDRESS: This field normally specifies the destination of the frame. This is the actual call signs of the source, destination, and any digipeaters. CONTROL: This field identifies the frame type. See FRAME TYPES below. PID: The first byte of the Data field is the Protocol ID, specifying the type of protocol in use. DATA: This is the actual data to be transferred. Many frames do not have a data field. FCS: Frame Check Sequence, this is how errors are detected in a frame. Your TNC creates a number based on the rest of the fields, using a special mathematical formula. The other TNC does the same, and if the numbers match, the frame has no errors and is accepted.

We will examine a typical frame:

```
KD6TH-4>N2DSY-2*>N2IRZ [I;3,1]:0042z, 838 msgs, #40407 last @KD6TH-4 Mailbox>
<---Address-------> <----> <--------Data------------------------->
                  Control
```

Note that you do not see the Flag, PID and FCS fields.

FRAME TYPES:

```
C     Connect frame. Also known as a 'SABM' frame.
D     Disconnect frame.
DM    Disconnect Mode frame.
I     Information frame.
UA    Unnumbered Acknowledgement frame.
UI    Unnumbered Information frame.
RR    Receive Ready command and response.
RJ    ReJect frame.
RNR   Receive Not Ready command and response.
FRMR  FRaMe Reject response.
DM    Disconnected Mode response.
```

When you type into your TNC a connect command, the TNC generates a frame like:

N2IRZ*>KD6TH-4 [C,P]

This means that N2IRZ is trying to connect to KD6TH-4. The * shows who is transmitting. The > shows the direction the frame is going (to KD6TH-4). The "C" indicates that it is a Connect frame, and the "P" means that the "Poll" bit is set. When the Poll bit is set, it means the originating station is Polling (or "searching") for the destination station (sort of asking "are you there ??"). If the destination station was to respond, it would send an "F", or Final, bit in response ("yep, I'm here"). If the radio path is "perfect", the Poll/Final bits will rarely be used again.

KD6TH-4 is able to establish a connection to N2IRZ, so it sends:

KD6TH-4*>N2IRZ [UA,F]

This means that KD6TH-4 has acknowledged receiving N2IRZ's Connect request, and confirms the connection. Your TNC generates the familiar "*** Connected to ..." message for you. KD6TH-4 now sends a greeting (his "Connect Text"):

KD6TH-4*>N2IRZ [I,P;0,0]:Hi Don, Welcome to KD6TH-4 BBS !

The "I" tells us that this is an information frame. The information (Hi Don...) can be any text. P is for Polling - KD6TH-4 is just making sure N2IRZ is still there. What is interesting here are the numbers in the "[I,P;0,0]:" part: The first number is the next frame number that KD6TH-4 expects from N2IRZ, and the second number is the number of the frame that is being sent. The order of the numbers switches when N2IRZ is sending. Upon receiving this frame without errors, N2IRZ sends:

N2IRZ*>KD6TH-4 [RR,F;1]

Telling KD6TH-4 that N2IRZ got frame 0 OK and is ready to receive frame 1. KD6TH-4 sends 2 more info frames to N2IRZ:

KD6TH-4*>N2IRZ [I;0,1]:*** You have Unread Mail !!!
KD6TH-4*>N2IRZ [I;0,2]:0045z, 745 msgs, #40498 last @KD6TH-4 Mailbox>

N2IRZ didn't get the First packet without errors, but did get the Second, so it sends:

N2IRZ*>KD6TH-4 [RJ;1]

Which tells KD6TH-4 that it is rejecting the received packet: N2IRZ still wants packet number 1. If both packets were received OK, N2IRZ would simply end [RR;3] and the process would continue, but if N2IRZ hadn't received EITHER packet, no response would have been sent. Then KD6TH-4 would have started polling:

KD6TH-4*>N2IRZ [RR,P;0]

N2IRZ would reply: N2IRZ*>KD6TH-4 [RR,F;1]

Eventually, N2IRZ is finished reading the mail, so he signs off:

N2IRZ*>KD6TH-4 [I;5,2]:Bye

This is N2IRZ's frame 2, and he expects frame 5 back. KD6TH-4 responds:

KD6TH-4*>N2IRZ [RR;3]
KD6TH-4*>N2IRZ [D,P]

First the "Bye" packet is acknowledged, and then KD6TH-4 initiates a disconnect. N2IRZ responds:

N2IRZ*>KD6TH-4 [UA,F]

and they are disconnected. KD6TH-4 now sends out its "MAIL_FOR:" beacon:

KD6TH-4*>BBS [UI]: Mail_for: N2DSY WA2SQQ KA2USU W5GZT

This last frame is an Unnumbered Information frame. The place it is addressed to (in this case, "BBS") is specified by the UNproto command, which usually has the default of "CQ".

Now you have a good idea of what C, UA, I, RR, RJ, D and UI frames are like. A DM frame is sent when the other station is busy, or CONOk is Off, and your TNC generates a message that "KD6TH-4 is Busy", while KD6TH-4's TNC generates a "*** Connect Request: N2IRZ" message.

The other frame types are somewhat rare: RNR is sent when one station polls another ("are you there ?") but the other station isn't ready to process another packet yet. FRMR is only sent when all hell breaks loose: the Frame Type (I, UA, RR, etc) is either undefined or improper protocol (Wrong type of reply).

If you would like to learn more about the AX.25 Protocol, or Packet Radio in general, I suggest the following:

Jim Grubbs, "Get ***CONNECTED to Packet Radio", QSKY Publishing, Springfield, IL. 1986. (Easy to read, great bibliography)

This article is part of an informal series of technical articles intended to promote experimentation, good operating habits, safety and technical knowledge. Feedback is welcomed.

AMATEUR RADIO TELEPHONE BBS LIST

Compiled for the USATVS by Mike Stone WB0QCD

January 1991 Edition

Communicating and "keeping in touch" with other Hams via telephone Bulletin Boards all across the country during "off-air" operations appears to be on the rapid increase. Presented below, is a list of KNOWN active HAM RADIO supported (or OF INTEREST) telephone BBS's in AREA CODE numerical order. This list took many months by several individuals to assemble in finished form. I personally (as Mike Donovan up at our Main Office who pays the phone bills will certainly attest to), have spent several hundreds of dollars researching this project. There are no doubt, many more HAM BBS's than appear on this, our first published listing. We'd like to hear about them from the general HAM community so we can keep this list as up-to-date and accurate as possible. There will be future printings.

We'd like to acknowledge and specially thank: Tom Brown KA2UGQ, Jeff Wallach N5ITU, Bill Fay KA0FDI, Bob Farrell WB2COY, Bill Poissant WA8AJG and others for a real "team effort" on gathering this information over the years. This list is one of the most extensive rosters of HAM BBS's ever published in the country!

If you try one of these BBS numbers and it is no longer on-line OR it offers very little in the way of Amateur Services, please let us know so we can drop it from the list. We are seeking those BBS's who really do make a serious effort and contribution toward serving the hobby. We try to list only those BBS's that have callsigns or Ham/Electronic type names to them. There are a lot of other boards that have Ham material as a minority feature which we chose NOT to list. We are NOT looking to "promote" a BBS that offers little to the Radio Amateur that "just happens" to be run by a licensed Ham. This distinguishes our list from those assembled by others. If we have "misjudged" a system out there, let us know about that too and we will check it out.

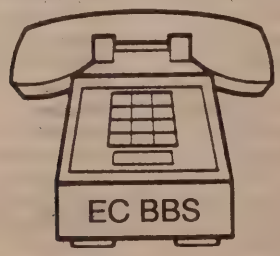
A word about the FREE use of most of these systems. Nothing is FREE in life. Someone pays for starting out and maintenance operating costs. We all fully recognize and understand the work and materials that goes into a Club or Individual Repeater system and most of us don't mind "kicking in" a few bucks per year to help out. Running a PUBLIC BBS is no different. On our EC BBS sponsored system, thousands of dollars of equipment and software are dedicated to answering your calls. KA0FDI recently purchased the latest version of the entire P.C. SIG Library on CD-ROM for $600.00. Few users will realize this and it isn't mentioned anywhere on the board. Pat Powers spends dozens of hours per week keeping the system up and running and helping us with all the changes we want made. SPEC-COM Ltd. has paid bucks for getting the Ham Radio side of the EC BBS started and continues to pay a regularly monthly maintenance fee. So, no matter what BBS you use, pick a few that you use regularly - and support them with some annual cash donations or memberships.

Downloading and "taking" lots of programs or text files from your favorite BBS should NOT always be a ONE-WAY street. "Give" back something to the BBS as well. Many BBS's REWARD those who Uplink with "extra" access time.

Most of the BBS systems shown, support 300-1200 baud at 8-N-1. Some also feature up to 2400 and higher baud rates. Many BBS's listed, also carry HAM PROGRAMS that can be Downloaded by the caller. The USATVS appreciates any Public Domain HAM RADIO programs given to us to place on "our own" ELECTRONIC COTTAGE BBS. We'd like to EARN THE REPUTATION as one of the LARGEST HAM RADIO "FREE" PROGRAM SOURCES here in America! To help us, simply Upload into the EC BBS (319) 582-3235 (300-2400 baud at 8-N-1) [H]am Radio MENU and [=] Operating Area OR send us 3.25" hard or 5 1/4" Floppy disks (disks returned if requested). We would be glad to return to YOU (on your sent disks), a like number of programs that you may not have (specify this request).

The symbol [*] placed to the right of the state location designates a MAJOR HAM DEDICATED SYSTEM that we have experienced during calling. Let us know, if you find one that deserves this special rating. We'd also like your comments, pro or con, on all these listed systems. Send your reports (and disks) to: USATVS Membership Services, c/o Mike Donovan KA0JAW at P.O. Box 1002, Dubuque, Iowa 52004. No other Ham Radio publication or organization has taken the time to bring you such an informative national listing. Just another innovative MEMBERSHIP SERVICE from The USATVS and this magazine. REMEMBER that at renewal time!

When you CALL these BBS's, please leave a message for the SYSOP of the board telling where you got their number. Thanks and "Happy Dialing!". -WB0QCD



This article also to be jointly published in RADIOSCAN Ham Radio Magazine.

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PUBLIC NOTICE!

The SPEC-COM Journal will once again EXPAND our coverage of Specialized Communications in our next and all future issues to include a special **WEFAX Information Column/Section**!

This **EXPANDED** section, is initially planned for 8-pages and if supported, will EXPAND even further to perhaps an additional 16 or 24 pages. SPEC-COM could grow to nearly 100 pages per issue! It depends on your support.

SPEC-COM "WEFAX" will be Edited and Developed entirely by one of the foremost experts in the field: **Greg Mengell KA6DPV** of Rancho Cordova, CA. Greg's name and reputation is well known in the WEFAX industry. He was a past Editor of The prestigious and well respected **J.E.S.A.U.G. Newsletter**. He built up his own successful FACSIMILE Equipment Supply and Consulting Company.

Greg will also be assisting us in **"beefing up"** the FACSIMILE section on our E.C. BBS in Dubuque, IA. He'll be with us this year at DAYTON for a special WEFAX talk and VCR demonstration at the **RAMADA INN NORTH** on Saturday night. KA6DPV is also our newly appointed USATVS California State Section Manager!

Greg has a lot of things lined up for this exciting new addition in The USATVS Journal. Need help on getting started on WEFAX? Do you need some good advice on acquiring gear? He is so serious and dedicated to the WEFAX mode - that he even has a **TOLL FREE WEFAX HOTLINE** 800 number! Give him a call for help and/or more information! His number is 1-800-468-3545. Welcome him to the pages of SPEC-COM!

To promote this exciting addition to our Staff, SPEC-COM Ltd. is making a **mass mailing to over 500 known WEFAX enthusiasts** inviting them to join with us by subscribing to our publication. We will also continue to send out **FREE sample issues** and list these issues properly under correct USPO guidelines.

If you know of someone really involved in WEFAX IMAGING - **please tell** them about Greg and our upcoming EXPANDED coverage! - Thank you.

Greg Mengell KA6DPV
2685 Ellenbrook,
Rancho Cordova, CA 95670

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That's right - we will **reimburse** you to make your **FIRST** 300-2400 baud (8-N-1) computer modem phonecall into our brand new **Electronic Cottage BBS** in Dubuque, Iowa! **How?** Send us a **copy** of the page on your next phone bill that shows your call to our Iowa (319) 582-3235 number. We will **reimburse you** by granting you ONE EXTRA SPEC-COM subscription issue ($3.33 value!) to your credit to pay for or help towards payment of the cost of that particular call (in most places in the U.S.A. - that's about a 10 minute call). **WE WANT YOU TO TAKE A LOOK AT WHAT WE HAVE DONE FOR AMATEUR RADIO SPECIALIZED COMMUNICATIONS!** We hope after you do take a quick peek, that you will become a **"regular user"**! Once you are Connected, just answer all the questions and follow the **easy to use** provided MENUS. Well, what are you waiting for? You 've always wanted to get a MODEM anyway for your computer (and afterall, it is Christmas "gift-giving" time isn't it?). Now is a good time to get yourself an early present! Stay in touch with the rest of the world when the bands are down or that frequency is busy. Call our new USATVS E.C. BBS today!

THE SPEC-COM JOURNAL

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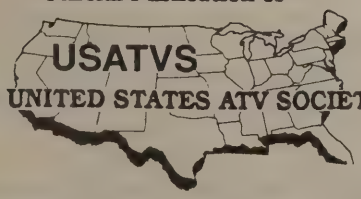

OFFER EXTENDED THROUGH JANUARY 31ST 1991

UNITED STATES TELEPHONE HAM (or Interest) BBS Systems

Courtesy of The SPEC-COM Communications & Publishing Group, Ltd.
(Master Database Resides on The Electronic Cottage BBS - 319-582-3235)

Area C/Phone	BBS Name/Title	Sysop(s)	QTH of Computer Board		
201-245-6614	The Micro Room	WA2BFW	Location Unk.	NJ	
201-271-4517	WB2TIX Radio BBS	WB2TIX	Bound Brook	NJ	
201-332-6098	Edgelight On-Line	KB2BLE	Jersey City	NJ	
201-494-3417	Planet Shadowstar	KB2CZO, N2HBN	S. Plainfield	NJ	
201-494-3649	Micro-Fone TBBS	John Kelly K2SHY	Metuchen	NJ	
202-280-5490	Capital Connection	Bob Shuck KB4ZSS	Washington	DC	
202-636-7499	The Micro Forum	KC2WZ	Location Unk.	NJ	
203-261-6434	Trumbull Mini BBS	WA1QKS	Trumbull	CT	
203-665-0161	ARRL General BBS	Unknown	Newington	CT	*
203-665-0090	ARRL Field Service	Unknown	Newington	CT	
203-438-9908	Orions Nebula	N1CUI	Location Unk.	CT	
203-753-8351	CoCo Byte	David Yale	Waterbury	CT	
205-598-6079	Elmer BBS	WA6LMM/4	Fort Rucker	AL	
205-649-2894	Mobile AL BBS	NN4Y	Mobile	AL	
205-758-5017	The Bulletin Board	W4WYP/WD4DAT	Location Unk.	AL	
205-895-0028	NASA Spacelink	Bill Anderson	Huntsville	AL	*
206-672-8989	A.E.A., Inc.	Andy	Lynnwood	WA	
206-763-8879	Sea-Comm 80 BBS	W7TWU	Seattle	WA	
206-767-3223	Amateur Radio Sup.	WB7EWO/W7PV Nites	Seattle	WA	
206-783-4818	Hi-Tech BBS	W7UZB	Seattle	WA	
207-495-2490	I.A.R.N.	K1MAN	Belgrade Lakes	ME	
212-380-3864	Atari BBS	K2BSM	Location Unk.	NY	
212-781-4723	Friends	WB2RSI	New York	NY	
213-541-2503	WB6YMH BBS	WB6YMH	Palos Verdes	CA	
213-761-8284	Kenwood Radio Inc.	Unknown	Long Beach?	CA	
213-376-6221	Beach City	KB6MND	Beach City?	CA	
213-377-0450	Amateur World	N6OQU	Palos Verdes	CA	
214-394-7438	Datalink FAX-AMSAT	J. Wallach N5ITU	Dallas	TX	*
213-541-2503	WB6YMH (GFRN) BBS	WB6YMH	Palos Verdes	CA	
213-826-4954	Henry Radio Stores	Unknown	Los Angeles	CA	
214-517-4958	Ham Shack	Michael Stone	Plano	TX	
214-960-2730	NN5I BBS	NN5I	Location Unk.	TX	
215-233-4313	Ham Net BBS	N3FAD	Philadelphia	PA	
215-482-0262	PARA Time Warp	W3IX	Philadelphia	PA	
215-572-5890	WA3DSP BBS	WA3DSP	Glenside	PA	
215-628-9265	K4KWW BBS	K4KWW	Location Unk.	PA	
215-827-7689	K3DSM BBS	K3DSM	Malvern	PA	
216-526-9480	AMCOMM (1) of 6	Bill Poissant	Cleveland	OH	
216-526-9481	AMCOMM (2) of 6	Bill Poissant	Cleveland	OH	
216-942-6382	Hamnet	David Speltz	Cleveland	OH	
217-529-6452	Capitol City BBS	Gary Huff K9UAB	Springfield	IL	
301-335-1955	WB3FFV Ham BBS	WB3FFV	Location Unk.	MD	
301-540-1378	WB6RQN Usenet gtwy	WB6RQN	Germantown	MD	
301-621-9669	Around & About	WA3TKW	Location Unk.	MD	
301-670-9621	Three Winks	W3INK	Gaithersburg	MD	
301-725-1072	F.C.C. PAL Hotline	Federal Com. Com.	Washington?	DC	*
301-831-5954	WJ3P Exchange	Lucas Spiros	Mt. Airy	MD	
301-831-9012	Thun Bay Trad Post	WA3ZLB	Unknown	MD	
303-497-5000	NOAA (propagation+)	Govt. BBS	Boulder	CO	
303-497-5042	NOAA 3 line rotary	Govt. BBS	Boulder	CO	
305-382-6687	Right Connections	N4LDG	Miami	FL	
305-859-9443	Orlando Communicatr	WA4GIF	Orlando	FL	
309-688-0604	ANARC BBS	Unknown	Peoria	IL	
312-529-1586	Elk Grove Village	N9DKO	Chicago	IL	
312-776-5561	N9CSA Ham & Hobby	Jay Serafin	Chicago	IL	
312-790-0187	Cope of Chicago	KB9X	Chicago	IL	
313-291-2520	Genesis II	WB8ZRN	Location Unk.	MI	
313-629-2854	Flint Area BBS	KA8OCN	Flint	MI	
313-759-6569	Royal Oak	W8SDZ	Royal Oak	MI	
314-436-0730	Boatmen's Bancshare	KE0KO	Location Unk.	MO	
314-447-3003	AMSAT-NA PBBS	Unknown	Location Unk.	MD	*
314-837-5422	Cindex Tech Support	J Furniss KB0FMQ	Florissant	MO	
315-697-3996	Random Access BBS	KB2ECI	Canastota	NY	
316-943-6030	Wichita BBS	KE0TV	Wichita	KS	
317-882-9330	Southside BBS	Murrey KB9BVN	Indianapolis	IN	
319-377-0004	Cedar Valley Mill	Unknown	Cedar Rapids	IA	
319-393-4499	Cedar Vally Datanet	Unknown	Cedar Rapids	IA	
319-557-9659	Sunshine BBS	Unknown	Cedar Rapids	IA	
319-582-3235	Electronic Cottage	Bill Fay KA0FDI	Dubuque	IA	*
319-582-3235	SPEC-COM Mag/USATVS	KA0JAW/WB0QCD	Dubuque	IA	*
404-289-2050	No Frills BBS	WB4LBM	Decatur	GA	
404-363-1640	Hams Bulletin Brd	WA4CBT	Forest Park	GA	
404-834-9097	Commodore Msg Ctr.	KB4EUX	Carrollton	GA	
404-949-0687	Lockheed AmateurBBS	Unknown	Location Unk.	GA	
407-879-4823	PC Logic	W4NVC	Location Unk.	FL	
414-543-0988	Milwaukee City ARES	WB9YSG	Milwaukee City	WI	

414-548-9866	Milwaukee HeathUser	KA9TGN	Milwaukee	WI	
415-481-0252	N6MON Ham BBS	N6MON	Location Unk.	CA	
415-961-7250	BBS-JC	K6LLK	Location Unk.	CA	
504-273-3116	HelpNet	W5KGG	Baton Rouge	LA	
504-395-5655	Bit-by-Bit RBBS	WB3ABN	Patterson	LA	
505-646-5194	Teacher's Pet FIDO	K5XY/W4GHV	Location Unk.	NM	
508-385-3427	KQ1K Salt Air BBS	Bob Baker	Dennis	MA	
508-429-1784	CUL-DE-SAC BBS	WA1YDL	Location Unk.	MA	
508-949-3590	The Ham Shack	Don Eklund	Webster	MA	
509-534-6866	ANARC BBS	Unknown	Spokane	WA	
509-697-7298	Cen Washington BBS	K7NTV	Selah	WA	
512-258-5528	Boardwalk Ham'n'Jam	Unknown	Location Unk.	TX	
512-359-1748	The Electronic Ave	KA5THB	Location Unk.	TX	
512-444-1052	Antenna Farm BBS	Ben Thornton	Austin	TX	
512-444-9908	Health Link	Bruce Baskett	Austin	TX	
512-734-3521	Radio Flyer	KA5SWI	San Antonio	TX	
513-253-2017	Ham Shack	Dave Shard	Kettering	OH	
513-762-1115	KIC BBS	KA8AWY	Location Unk.	OH	
513-777-1234	PME-FIDO BBS	WB8BFW	Location Unk.	OH	
515-961-3325	WORPK AMSAT BBS	WORPK	Indianola	IA	*
516-293-2283	Radio Electronics	R.E. Magazine	Farmingdale	NY	*
516-472-0691	The Idea X-Change	N2AYB	Bayport	NY	
516-581-1896	HamRadio Sell.Post	Lenny Buonaiuto	Location Unk.	NY	
516-661-3643	South Shore ARC	WB2VOZ	Long Island	NY	
518-374-5298	Radio Freq's	Unknown	Latham	NY	
603-525-4438	73 Magazine (Main)	KW1O	Peterborough	NH	*
603-883-4466	The Legal Beagal	K1TCD	Nashua	NH	
603-924-9809	73 Magazine	KW1O	Peterborough	NH	
609-652-2921	ACADEMIA	WB2DRD	Pomono	NJ	
609-894-4366	N2EHM BBS	N2EHM	Pemberton	NJ	
612-291-0567	Digital Newsletter	John Desmond KOTG	St. Paul	MN	
612-326-0000	Digital Newsletter	John Desmond KOTG	St. Paul	MN	
612-431-1149	HR Commodore Clique	WAOCQG	Apple Valley	MN	
614-457-4227	Ham BBS (HBBS)	N8EMR	Columbus	OH	
617-729-3025	ECAT ATV Club BBS	Unknown	Boston	MA	
617-237-1511	Wellesley BBS	Heath Users Club	Wellesley	MA	
617-326-0259	Binex II	KB1S	Westwood	MA	
617-471-0542	Tom's BBS	KA1TOX	Wollaston	MA	
617-565-9136	WB3ABN BBS	WB3ABN	Boston	MA	
619-390-7328	Lakeside Wildcat!	N6CQW	Location Unk.	CA	
701-746-4814	Shortwave Network	Unknown	Location Unk.	ND	
703-366-4299	Sparkie's Machine	KC4LWI	Roanoke	VA	
703-528-7753	Longwave Database	Unknown	Arlington	VA	
703-680-5970	Virginia Packet	K4NGC	Location Unk.	VA	
703-689-7156	KC3OL BBS	KC3OL	Location Unk.	VA	
703-734-1387	AMRAD BBS	K8MMO	McLean	VA	*
708-234-8011	Callbook BBS	Callbook Publish.	Lake Bluff?	IL	
708-529-1586	Elk Grove Repeater	Glen Randles	Arlington Hgts	IL	
713-280-8711	NASA Activities	NASA	Houston	TX	*
713-498-7996	Launch Pad	Unknown	Houston	TX	
713-937-9097	Broadcast Computer	David Armstrong	Houston	TX	
714-275-9094	N6KZB BBS	N6KZB	Location Unk.	CA	
714-681-0731	Ham Radio West	John Warren	Riverside	CA	
716-663-8478	NF2G Online	David Stark	Rochester	NY	
718-268-3173	WB2SQM BBS	WB2SQM	Location Unk.	NY	
719-390-5318	Colorado Spr. Ham	Lee Sublett	Co. Springs	CO	
804-471-3360	Tidewater AR/CF	Jim Rhodes	Virginia Beach	VA	
805-947-4357	WB6FIU FIDO BBS	WB6FIU	Palmdale	CA	
806-352-2482	The Radio Board	Ron Chase	Amarillo	TX	
806-352-9365	The Radio Board	Ron Chase	Amarillo	TX	
813-874-3078	Pac-Comm, Inc. BBS	KC2FF/W1BEL	Tampa	FL	
813-920-8820	Prof Data Exchange	John Brock K8WVH	Tampa	FL	
816-241-1012	NOAJI BBS	NOAJI	St. Louis	MO	
816-331-7023	Online II Ham Radio	Unknown	Belton	MO	
817-531-4761	Dept of Electronic	KC5WE	Ft. Worth	TX	
818-998-0319	CSC Ham BBS	K6IYK	Pasadena	CA	
904-651-8684	Hot Muddy Duck	N4HMD	Pensacola	FL	
913-345-1978	ANARC	ANARC	Shawnee Mission	KS	
914-485-3393	COY HamNET	Bob Farrell WB2CO	Poughkeepsie	NY	*
915-653-9077	HAMNET BBS	N5JZZ	Location Unk.	TX	
916-366-5531	Am Radio Quick BBS	Howard Evans	Rancho Cordova	CA	
916-678-1535	WA6RDH BBS	WA6RDH	Location Unk.	CA	
916-920-1288	QST BBS	Unknown	Sacramento	CA	
918-747-0250	Ham & Egg Center	Unknown	Tulsa	OK	

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403-464-5069	Alta Packet Info	Unknown	Canada

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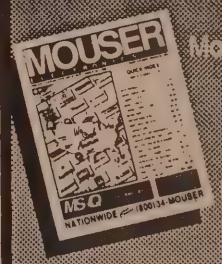

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519-578-9314	Amateur Radio BBS	Fred Hicks	Canada
519-660-1442	VE3GYQ BBS	VE3GYQ	Canada
613-542-9901	Dits & Bits	Unknown	Canada
902-868-2475	VE1EI BBS	Doug Oldridge	Canada
001-478-6703	B.E.S.T.	Mohamed	Saudi Arabia
011-353-1-88-56-34	Dublin Users BBS	Unknown	Ireland
011-31-35-45395	Radio Netherlands FIDO	J Engles	Holland
011-44-707-52242	RSGB Databox	Unknown	United Kingdom
011-46-8-7564197	Ham Systems Base	Unknown	Sweden
011-47-2-267414	The Ham Chat	Unknwon	Norway
011-852-0-459	Hamnet Hub	Unknown	Hong Kong
011-03-512-5396	Radio Amateurs Club	Shlomo Musaali	Israel
011-04-381-299	The Miler House	4Z4RN	Israel
011-47-34-59530	Dasan BBS	Unknown	Norway
011-54-1-51-9973	Gateway	LU7ABF	Argentina
011-54-1-764-4189	Telecom Net	Unknown	Argentina
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COYnet AMATEUR RADIO BBS
Written for The USATVS by Bob Farrell WB2COY

COYnet Amateur Radio BBS - Owned and operated by Bob Farrell, WB2COY COYnet is a Telephone Dial-up Bulletin Board System that specializes in files and information for Hams, SWLs and prospective Hams. It can be reached at **914-485-3393** 24 Hours/Day using 1200 or 2400 BPS and 8 Data Bits, 1 Stop Bit, No Parity (8-N-1). High Speed callers can access COYnet at 9600-38400 BPS using the USRobotics(tm) HST standard.

COYnet is located in Poughkeepsie, New York, in the beautiful Mid-Hudson Valley. COYnet has gone through several incarnations since it was originally established in August of 1985. At that time, it was known as "HamNet-80", and was running on a Tandy TRS-80 Model III computer, with a 1200 baud modem and four 80-track (720K) floppy drives. The software was "Bullet-80" (tm), a BASIC program which was greatly enhanced by WB2COY. This arrangement remained in place until the Fall of 1988, when activity dropped to a level that it became unproductive to keep the system going.

At about this time, the WB2COY Packet MailBox came into being, and the telephone BBS remained offline until the Spring of 1989. At this time, there was a period of experimenting with various BBS software, until November of 1989, when PCBoard(tm) was chosen as the BBS software, and COYnet was placed into full-time operation. The hardware was a JameCo 10MHz 8088 motherboard, two 20 megabyte hard drives, and a GVC Super Modem 2400. Further hardware evolution has taken place, with the current system setup including a Packard Bell(tm) Legend 386SX [16 MHz, 0 wait states, 2.5mb RAM, 135mb 20ms Hard Drive], CTX VGA Monitor and a USRobotics Courier HST modem. The software is PCBoard(tm) Version 14.5/D, DESQview(tm) 2.31, and QEMM(tm) 5.11.

In addition to the Landline BBS, the computer is running W0RLI MailBox software in a DESQview window, that receives auto-forwarding from the WB2COY Packet MailBox computer over a null modem cable arrangement. A custom written program allows the Landline BBS callers to read bulletins posted to the Packet system. To allow all callers, Ham or not, to view the bulletins, this program was made "read only", so there is no chance of an improper message making its way onto the air. The entire expense of providing the hardware, software and maintenance of COYnet is borne by WB2COY, who does it for the enjoyment of providing a service to the Amateur Radio community, and to prospective Hams and SWLs as well.

Unlike many other BBS systems, COYnet allows full access to the system on your first call, after spending only a few moments to register. WB2COY's philosophy is that running the BBS this way will result in the users being more willing to contribute to everyones enjoyment of the system by uploading programs and files that will be of benefit to us all. So far, this philosophy has met with a fair amount of success.

COYnet currently contains over 20 file areas, with 665 files in over 27 megabytes of Hard Disk space. These files represent programs and information on a wide variety of topics. There are eight specialized conferences, including Packet Radio, DOS Utilities, SWL, QSL Manager, DX News, Scanners, For Sale and Equipment MODs, and the list is constantly growing. COYNet recently became a shadow for the well-known KJ6FY Equipment MODS Database, which contains modification instructions for over 130 models of Ham Radio transceivers.

COYnet also offers many "Doors", which are programs that run interactively, outside the covers of the BBS software. There are Doors for Checking your Call Statistics, Running programs to calculate Beam Headings and Distance, Intermod products, and general Ham calculations.

The following is a further representation of the COYnet System: Hardware; Telephone BBS Computer: Packard Bell Legend 386SX, 16 MHz, 2.5 MB RAM, 135 Megabyte Harddisk Monitor - CTX VGA Modem - USRobotics Courier HST (with V.42bis) Packet BBS Computer: Heath/Zenith H-158/XT, 8 MHz, 2.5 MB RAM, 10 Megabyte Harddisk Monitor - Sony KV-1311CR - CGA 2-DRSI PC*PA Type 2 Packet Cards 145.09 MHz - Kenwood TR-9000 10 Watts, Ringo Ranger 221.11 MHz - Yaesu FT-311RM 25 Watts, Cushcraft 4-el Beam 221.17 MHz - Yaesu FT-103R 15 Watts with Amp, AEA Isopole 438.025 MHz - Kenwood TM-411A 5 Watts Cushcraft 11-el Beam Software Telephone BBS: PCBoard 14.5/D, W0RLI 11.xx, DESQview 2.31, QEMM-5.1 Packet BBS: W0RLI 11.xx, G8BPQ PC/Node, DESQview 2.26, PC-TOOLS Cache Networking. COYnet Computer has 3 active DESQview Tasks, Packet Computer has 4. - COYnet W0RLI PBBS polls Packet Computer once per hour. All Bulletins reverse forwarded between systems. PAKDOOR Door on COYnet BBS allows access to the Packet Mail stored by W0RLI.

Unlike many other BBS systems, COYnet does NOT place any download restrictions on it's users. You will not be required to maintain a certain upload/download ratio in order to continue downloading files. Uploaders do, however, enjoy a benefit of more time allowed on the system. While this is likely to backfire on me, I will continue it as long as I can. I am already supplying the hardware, phone line and time to keep this system functional and I cannot afford to make expensive long distance calls to get software for you to download. I would appreciate an upload now and then if you have downloaded regularly. This policy will continue as long as YOU cooperate. If it fails, I will be forced to join the bandwagon of other systems and impose download restrictions. It's up to YOU! Thanks for the publicity SPEC-COM! 73, de Bob, WB2COY SysOp.

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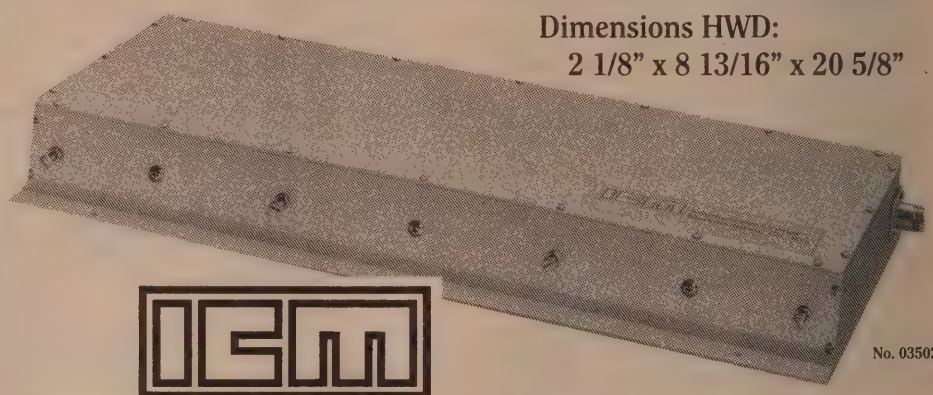

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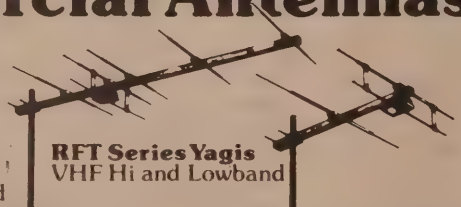

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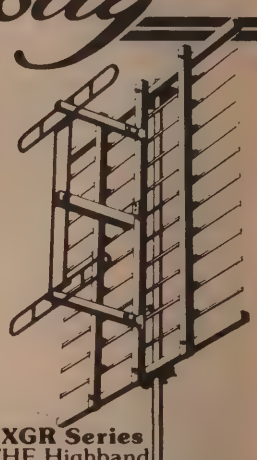

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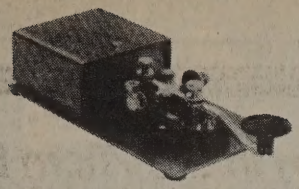

FCC NO-CODE LICENSE - Comments

by Mike Stone WB0QCD

Late Thursday afternoon at approximately 4 pm. December 13th - Dale Lam WA0NKE (our Kansas State Section Manager - Club, Contest & Special Events Column Editor) called us to alert us to the fact that word spreading around like wildfire at Missouri Radio and on 2 meters in the local Kansas City area, was that the FCC in Washington, had just passed the pending and very controversial Docket 90-55 (termed at the time COMMUNICATOR) CODELESS CLASS ENTRY LICENSE. Dale knew very little of the facts but just alerting us gave us the jump on our competitors. As the result of Dale's hot-tip, SPEC-COM was one of the first national Ham Radio publications to get the word out about this important development to the Amateur Community.

In fact, the story was just too BIG to keep to ourselves and so, we alerted several other magazines and organizations who were not aware of the hot development (after getting confirmations and more details on the matter from the ARRL, WESTLINK and the FCC). These included WORLDRADIO, MONITORING TIMES, KENWOOD, AEA and others. WORLDRADIO was about to go to press within 10 days with their next issue and they greatly appreciated our news so they too could run the story. KENWOOD and AEA got excited at the possibility of new growth and sales! Bill Pasternack WA6ITF of WESTLINK actually knew something was about to happen and he dispatched a film crew in Washington to cover the event for history. At our request, the FCC in Washington FAX'd us a copy of the No. DC-1777 TELEFAX News Media Release to our Clarence FAX phone number at 2:09 pm. on the 14th. We have a pretty good repour now going with several FCC officials (Now if we can just turn them around about 89-554!).

As many of you know, I (as the author & editor), The USATVS and SPEC-COM Magazine took a lot of heat from the Amateur Industry and community several years ago when we publically came out with a POSITIVE stand for a NO-CODE type entry license. At the time, only 73 Magazine was with us on favoring such a proposal. QST, HAM RADIO, other Ham publications and organizations were solidly against it. Only a couple years later, after much public debate, published articles and comments, did re-thinking on the subject change opinions and soon everyone else it seemed climbed on the bandwagon wanting to see such a proposal get passed in one form or the other.

We stated quite clearly in our initial position, that our interests were admittedly selfish in that we could see a lot of benefit by bringing in to the ATV and other Specialized Mode industry - a whole new crop of technically competent, electronic enthusiasts such as TV and Radio engineers, etc. who had absolutely no interest in learning the code whatsoever but who had so much to offer the Ham community with their varied interests and professions.

SPEC-COM (The USATVS Journal) was the only ATV based publication to take such a stand on this controversial issue. Now that it has passed, we are relieved and welcome all new licensed operators. We personally applaud the way the FCC chose the QCWA suggestions over that of the Leagues. The TECHNICIAN ticket is the correct ticket to give an entry level, codeless license to. Former privleges should be grandfathered and they were. NOVICE still remains an entry level class with CW and HF/UHF (limited) privleges. All other license grades remain unaffected.

Once the word gets out to the electronic based, communications industry in particular - we hope to see a tremendous growth rate in ATV and other specialty communications modes. The task now to perform, is to get the word out and to get these already interested talented people and to get them involved with local Ham Clubs or ready for personal VEC testing. I am afraid that the ARRL may not fully cooperate in an all-out effort to get the public's interest in this new FCC license for awhile. I hope that I am wrong about that. Make this new development "top item" in all your Club Newsletters and at Hamfests! Talk about it on 2 meters (a lot of public scanners are programmed for listening). Contact known Shortwave Listening operators with the good word. By all means make an effort to inform all your TV and Radio Station and two-way commercial repair shop non-Ham buddies - that a CODELESS Amateur license is now here! I really feel the bands are going to be the better for it. The still required, written tests will filter out most of the rift-raft and those that do get through the built-in screening system - we all will eventually take care of down the road - one way or the other, won't we? -WB0QCD

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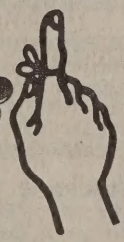

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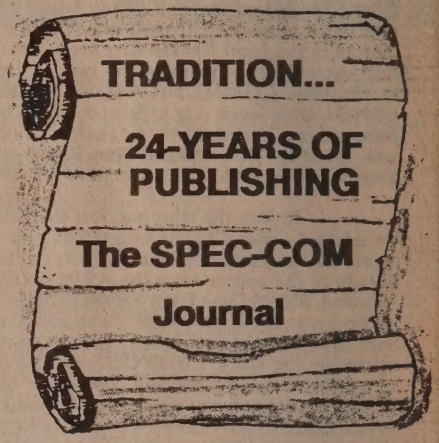

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TS-790A
Satellite Transceiver

The new Kenwood TS-790A VHF/UHF all-mode tri-band transceiver is designed for the VHF/UHF and satellite "power user." The new TS-790A is an all-mode 144/450/1200 MHz transceiver with many special enhancements such as automatic uplink/downlink tracking. Other features include dual receive, automatic mode selection, automatic repeater offset selection for FM repeater use, VFO or quick step channel tuning, direct keyboard frequency entry, 59 memory channels (10 channels for separate receive and transmit frequency storage), multiple scanning and multiple scan stop modes. The Automatic Lock Tuning (ALT) on 1200 MHz eliminates frequency drift. Power output is 45 watts on 144 MHz, 40 watts on 450 MHz, and 10 watts on 1200 MHz. (The 1200 MHz section is an optional module.)

- **High stability VFO.** The dual digital VFOs feature rock-stable TCXO (temperature compensated crystal oscillator) circuitry, with frequency stability of ±3 ppm.
- **Operates on 13.8 VDC.** Perfect for mountain-top DXpeditions!
- **The mode switches confirm USB, LSB, CW, or FM selection with Morse Code.**
- **Dual Watch allows reception of two bands at the same time.**
- **Automatic mode and automatic repeater offset selection.**
- **Direct keyboard frequency entry.**
- **59 multi-function memory channels.** Store frequency, mode, tone information, offset, and quick step function. Ten memory channels for "odd split."
- **CTCSS encoder built-in.** Optional TSU-5 enables sub-tone decode.
- **Memory scroll function.** This feature allows you to check memory contents without changing the VFO frequency.
- **Multiple scanning functions.** Memory channel lock-out is also provided.
- **ALT—Automatic Lock Tuning—on 1200 MHz eliminates drift!**
- **500 Hz CW filter built-in.**
- **Packet radio connector.**
- **Interference reduction controls:** 10 dB RF attenuator on 2m, noise blanker, IF shift, selectable AGC, all mode squelch.
- **Other useful controls:** RF power output control, speech processor, dual muting, frequency lock switch, RIT.
- **Voice synthesizer option.**
- **Computer control option.**

Optional Accessories:
• **PS-31** Power supply • **SP-31** External speaker • **UT-10** 1200 MHz module • **VS-2** Voice synthesizer unit • **TSU-5** Programmable CTCSS decoder • **IF-232C** Computer interface • **MC-60A/MC-80/MC-85** Desk mics • **HS-5/HS-6** Headphones • **MC-43S** Hand mic • **PG-2S** Extra DC cable

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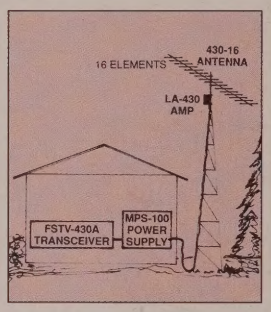
INTRODUCING AEA'S NEW ATV SYSTEM

Add a new dimension to your amateur radio communications with AEA's Amateur Television (ATV) system. If you hold at least a technician-class license, you can transmit and receive live or taped audio and video Fast-Scan TV (FSTV) information that rivals broadcast quality. Now you can share more than conversation over the air with this new mode of "personal communications."



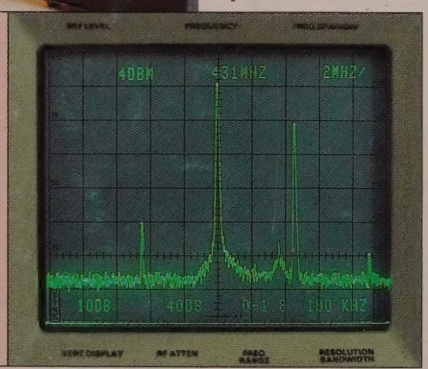
It's Easy and Inexpensive. If you have a video camera or camcorder and a standard TV set, you may already own the most expensive components of an ATV system. AEA's ATV system includes a transceiver and antenna. Simply connect the camera, TV and the antenna to the transceiver, and you're on the air LIVE with one watt P.E.P.! Your TV set will monitor your transmitted and received pictures. If you want to broadcast with more power, AEA also offers a 50 watt mast-mounted linear amplifier with power supply.

The FSTV-430A Transceiver features a low-noise UHF GaAsFET preamp with a typical noise figure of less than 1.5dB and a crystal-controlled or variable tuning down converter. Output is available on channel 3 or 4 for signal reception AND monitoring transmissions. Two frequencies can be selected from the front panel for transmission (one crystal is included). The AEA design is also optimized for superior video and audio quality without sync buzz even with weak signals. The FSTV-430A is the only transceiver you need to work ATV and it also allows you to use the same TV set to monitor your transmitted and received pictures.

The LA-430/50 Amplifier with Power Supply gives a boost to your ATV signal. It includes a 50W P.E.P. mast-mounted Linear Amplifier (**patent pending**) covering 420 to 450 MHz and a GaAsFET preamp which utilize the antenna feedline for DC power. The mast- mount eliminates the line loss between the amplifier/preamplifier and the antenna to improve both transmission and reception, and is the equivalent of a 100W amplifier in the shack with a 3dB line loss. The amplifier is housed in a weather-resistant alodized aluminum case. The MPS-100 power supply also provides a 13.6 volt output for the FSTV-430A.

What is the advantage of Vestigial Sideband (VSB)?

AEA's FSTV-430A Vestigial Sideband operation drastically reduces adjacent-channel interference. VSB requires much less bandwidth than existing double-sideband designs; it's the standard method of modulation required by the FCC for all U.S. broadcast TV stations. Similar in principle to SSB, VSB puts all of the audio energy and most of the video in ONE sideband instead of two. Using about half the spectrum space of competitive units, the FSTV-430A is the ONLY ATV unit that conserves spectrum space by using VSB. Even with AEA's LA-430/50 amplifier, one sideband is reduced more than 30dB. VSB presents an obvious advantage to the bandwidth-conscious ATV operator.



The 430-16 Antenna is a high-performance, computer-optimized yagi specifically designed for ATV operation. It features broadband frequency coverage from 420 to 440 MHz, 14.3dB gain, O-ring sealed connectors, 28 degree E plane and 32 degree H plane beam widths and 16 elements on a 10-foot boom.

See AEA's FSTV System at your local authorized AEA dealer. Put yourself in the ATV picture and join the fun!

Advanced Electronic Applications, Inc.
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Prices and specifications subject to change without notice or obligation.
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